Government of Rajasthan

‘

State Disaster Management Plan (SDMP)

Year - 2014

Government of Rajasthan
Disaster Management & Relief Department
Jaipur, Rajasthan

Acknowledgements

The Disaster Management and Relief Department under the overall leadership of the Chief Minister of Rajasthan is grateful to all the stakeholders towards preparation of the State Disaster Management Plan. While following the Disaster Management Act, 2005 due cognizance has been given to the unique requirements of the state to ensure a people-oriented approach.

The present document has been prepared following extensive interaction with key nodal agencies like Health & Family Welfare, Agriculture & Animal husbandry, Mines & Industries, Irrigation & Water Resources, Local Self Government & Urban bodies, Disaster Management & Relief Department, Fire Department, Police, Border Security Force and key districts around the state. Interaction was also done with the industries present in the state, which could be converted into an effective public-private partnership and the supply chain of the big brands can be used both pre and post disaster. Keeping in view the "community" as the ultimate beneficiary, and following interactions with them, the need to have department wise templates for disaster management plan have been prepared with clearly spelt out roles to ensure proper coordination, preparedness & response both pre and post disaster along-with linkages from the state to the district and right up to the village level has been drawn to achieve a sense of involvement and ownership by the stakeholders

Well worked out preparedness plan & mitigation strategy along with an active response system, building of an inventory at multiple locations would ensure a single line of response, proper utility of resources that would thereby lead to considerable reduction of life and property during any emergency.

I would like to take the opportunity to thank Sh. Tanmay Kumar, IAS, departmental officers comprising of Sh. Bijender Singh, OSD for main SDMP and Sh.Sandeep Chauhan, FA for financial aspects and all other officers across the state and support staff of the department for taking interest, and being deeply involved in bringing new ideas towards working out the document.

Kunjilal Meena (IAS)

SECRETARY

Disaster Management & Relief Department

Government of Rajasthan

Preface

In 2005, Government of India passed the Disaster Management Act and the National Disaster Management Authority was set up, under the chairmanship of the Prime Minister, which made it mandatory for all the states in the country to draw their respective Disaster Plans for better preparedness and response.

To fulfil the principles of the Disaster Management Act, Government of Rajasthan started streamlining its disaster management preparedness and mitigation strategy by drawing its own plan keeping in view the unique requirements of the state and addressing its own issues with a hands-on user friendly approach.

The entire document has been divided into three parts. Part-I comprises of ten chapters which gives theoretical and practical solutions to the overall subject of disaster management in the context of the state. To elucidate each of them, Chapter-1 gives a vision of the state while Chapter 2 outlines the state profile. Chapter 3 gives the hazard, vulnerability & risk assessment of the state which is represented in GIS maps. Chapter 4 provides department wise Prevention and Mitigation strategy for the identified hazards as a pre-disaster activity. Chapter 5 integrates the developmental schemes both at the state and national levels along-with the Millennium Development Goals. Chapter 6 elaborates on the Preparedness measures and the activities to be undertaken by the state and the departments in terms of capacity building, early warning systems, and setting up of a response mechanism. Chapter 7 calls for Capacity Development that could be done through training, mock drills, and general awareness with a community focus. Chapter 8 gives a response mechanism that would activate the plan. Chapter 9, which is on Recovery and Reconstruction, dwells on post disaster activities and Chapter 10 explains the Funding Arrangements for disaster management in terms of relief assistance. Further to make it user friendly, schematic representations of the contents of most chapters have been given that would enable various stakeholders to prepare their own documents as per the specifications of the SDMP. Part-II outlines Disaster Specific Action Plans as identified in the state, and Part-III recognizes the plan to be dynamic and calls for review and updation. In other words, with global warming being a reality different types of disasters occur which in turn create new situations and thereby require a new response mechanism. Therefore, it is important that the document needs to be periodically reviewed and updated as per the need of the hour. To finally sum-up the SDMP serves as guideline for the state government machinery and other stakeholders for better coordination, planning and execution in both pre and post disaster situations. However, it needs to be noted that it gives written guidelines to respond to a particular situation, while emphasis needs to be laid on basic awareness training vertically and horizontally across departments and also at the community level to create a “culture of preparedness and safety.”

Glossary

Abbreviation	Expanded Form
ARMVs	Accident Relief Medical Vans
ATIs	Administrative Training Institutes
BIS	Bureau of Indian Standards
CBDM	Community Based Disaster Management
CBOs	Community Based Organisations
CBRN	Chemical, Biological, Radiological and Nuclear
CCMNC	Cabinet Committee on Management of Natural Calamities
CCS	Cabinet Committee on Security
CRF	Calamity Relief Fund
CSCs	Community Service Centres
CSR	Corporate Social Responsibility
DDMA	District Disaster Management Authority
DM	Disaster Management
DM ACT, 2005	Disaster Management Act, 2005
EOC	Emergency Operations Centre
GIS	Geographic Information System
GOI	Government of India
GPS	Global Positioning System
HLC	High Level Committee
HPC	High Powered Committee
HR	Human Resources
HRD	Human Resource Development
IAY	Indira Awas Yojana
ICS	Incident Command System
ICT	Information and Communication Technology
IDKN	India Disaster Knowledge Network
IDRN	India Disaster Resource Network
IDSP	Integrated Disease Surveillance Programme
IITs	Indian Institutes of Technology
IMC	Inter-Ministerial Committee
IMG	Inter-Ministerial Group

IT	Information Technology
ITIs	Industrial Training Institutes
ITK	Indigenous Technical Knowledge
MHA	Ministry of Home Affairs
MIS	Management Information System
MDG	Millenium Development Goals
NBC	Nuclear, Biological and Chemical
NCC	National Cadet Corps
NCCF	National Calamity Contingency Fund
NCDM	National Committee on Disaster Management
NCMC	National Crisis Management Committee
NDEM	National Database for Emergency Management
NDMA	National Disaster Management Authority
NDMF	National Disaster Mitigation Fund
NDMRCs	National Disaster Mitigation Resource Centres
NDRF	National Disaster Response Force
NEC	National Executive Committee
NGOs	Non-Governmental Organisations
NIDM	National Institute of Disaster Management
NITs	National Institutes of Technology
NSDI	National Spatial Data Infrastructure
NSS	National Service Scheme
NYK	Nehru Yuva Kendra
NYKS	Nehru Yuva Kendra Sangathan
PPP	Public-Private Partnership
PRIs	Panchayati Raj Institutions
R&D	Research and Development
SAARC	South Asian Association for Regional Cooperation
SDMA	State Disaster Management Authority
SDRF	State Disaster Response Force
SEC	State Executive Committee
SOPs	Standard Operating Procedures

ULBs	Urban Local Bodies
UN	United Nations
UTs	Union Territories
WMO	World Meteorological Organization

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Government of Rajasthan

State Disaster Management Plan (SDMP)

Part 1 : STATE PLAN

Chapter 1 - Introduction

The Context

Disasters disrupt progress and destroy years of painstaking development efforts, thereby pushing nations back by several decades. The impacts of disasters are particularly strong in case of developing nations in terms of recovery therefore, both pre-disaster efforts in terms of preparedness, capacity building, awareness along with an efficient response mechanism, recovery and reconstruction would lessen the loss of lives and property.

India is vulnerable, in varying degrees, to a large number of natural as well as man-made disasters. About 58.6% of the land mass is prone to earthquakes of moderate to very high intensity; over 40 million hectares (12% of total area) is prone to floods and river erosions; of the 7,516 km long coastline, close to 5,700 km is prone to cyclones and tsunamis; 68% of the cultivable area is prone to drought and hilly areas are at risk of landslides and avalanches. Vulnerability, to disasters / emergencies of Chemical, Biological, Radiological and Nuclear (CBRN) origin also exists. The disaster risks in the country have further increased due to rapid population growth, urbanization and industrialization, development within high risk zones, and environmental degradation and climate change.

Within the country, Rajasthan is one of the most drought prone states, due to its low average rainfall, coupled with erratic behaviour of Monsoons. The state has also witnessed some major disasters in the recent past, like the floods in Barmer (2006), IOC Depot Fire, at Jaipur (2009), the stampede at Jodhpur (2008), the serial bomb blasts, Jaipur (2008), and the collapse of Chambal bridge at Kota (2009) to name a few. Further, some parts of the state fall under seismic zones III and IV.

Looking at the large proportion of economically and socially weak sections that make up the total population of the state, vulnerability to disasters in the state is also very high. Within these vulnerable groups, elderly persons, women, and children – especially destitute women/orphaned children and physically challenged persons are exposed to higher risks.

Government of India passed the Disaster Management Act, 2005 and with it came a paradigm shift from response and relief centric approach to a proactive prevention, mitigation and preparedness-driven approach for preserving development gains and for minimizing loss to life, livelihood and property.

Vision

The vision of the SDMP is in parlance with the DM Act 2005. The plan visualises a holistic, pro-active, multi-disaster, multi-sector, multi-stakeholders, technology driven, participatory, dynamic process to build Rajasthan a safe and disaster resilient State.

Approach

A holistic, proactive and people centric approach will be adopted towards disaster management with emphasis on the following:

- Community based DM, including last mile integration of the policy, plans and execution.
- Capacity development in all spheres.
- Consolidation of past initiatives and best practices.
- Cooperation with agencies at national and international levels.
- Multi-sectoral synergy.

Objectives

The aim of the SDMP is to ensure that the following components of DM are addressed to facilitate planning, preparedness, operational coordination and community participation:

- Promoting a culture of prevention and preparedness, so that DM receives the highest priority at all levels.
- Ensuring that community is the most important stakeholder in the DM process.
- Encouraging mitigation measures based on state-of-the-art technology and environmental sustainability.
- Mainstreaming DM concerns into the developmental planning process.
- Putting in place a streamlined and institutional techno-legal framework for the creation of an enabling regulatory environment and a compliance regime.
- Developing contemporary forecasting and early warning systems backed by responsive and fail-safe communications and Information Technology (IT) support.
- Promoting a productive partnership with the media to create awareness and to contribute towards capacity development.
- Ensuring efficient response and relief with a caring approach towards the needs of the vulnerable sections of society.
- Undertaking reconstruction as an opportunity to build disaster resilient structures and habitats.
- Undertaking recovery to bring back the community to a better and safer level than the pre-disaster stage.

Coverage

As per section 23 of the DM Act, 2005, it is mandatory for the state to formulate a State Disaster Management Plan. The Act lays down the broad coverage of the plan as follows:

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

- The roles and responsibilities of each department of the State Government in context of the above;
- The roles and responsibilities of different departments of State Government in responding to any disaster situation or disaster.

The Act provides for annual review and updation of the State Plan. The State Government would make provisions for financing the activities to be carried out under the State Plan. It is also obligatory for the departments of State Government to draw up their own plans in accordance with the State Plan.

Institutional Framework

1. National Disaster Management Authority (NDMA)

The NDMA, as the apex body for disaster management, is headed by the Prime Minister and has the responsibility for laying down policies, plans and guidelines for DM and coordinating their enforcement and implementation for ensuring timely and effective response to disasters. It will approve the National Disaster Management Plan and DM Plans of the Central Ministries / Departments.

2. National Executive Committee (NEC)

The NEC is the Executive Committee of NDMA, which assists the NDMA in the discharge of its functions and also ensures compliance of the directions issued by the Central Government/NDMA. It is headed by the Union Home Secretary, along with Secretaries from some other ministries, and senior officers of GOI as members.

3. National Institute of Disaster Management (NIDM)

Capacity building along with training, research, documentation and development of a national level information base is the main responsibility of NIDM. It organizes training of trainers, DM officials and other stakeholders.

4. National Disaster Response Force (NDRF)

NDRF is constituted for the purpose of specialized response to disaster situation/disasters/emergencies, both natural and manmade, under the command and supervision of NDMA. The NDRF, presently comprising of 8 to 10 battalions, is positioned at different locations in the country. NDRF units would maintain close liaison with the designated State Governments and it would provide prompt services in handling disasters. It will also impart basic training to all the stakeholders identified by the State Governments.

5. State Disaster Management Authority (SDMA)

At the State level, the SDMA, headed by the Chief Minister, has the responsibility for laying down policies and plans for DM in the State. It would approve the State Plan in accordance with the guidelines laid down by NDMA, coordinate the implementation of the State Plan, recommend provision of funds for mitigation and preparedness measures and review the departmental plans of the different departments of the

State, to ensure the integration of prevention, preparedness and mitigation measures.

6. State Executive Committee (SEC)

The SEC, headed by the Chief Secretary of the State Government, has the responsibility to assist the SDMA in the performance of its functions. It has the responsibility to coordinate and monitor the implementation of the National Policy, National Plan and the State Plan.

The primary responsibility for disaster management rests with the State. The institutional mechanism put in place at the Centre, State and District levels would help the State manage disasters in an effective manner.

7. State Disaster Response Force (SDRF)

SDRF has been constituted in the State, with the assistance of Rajasthan Armed Constbulary (RAC). Initially, it is comprised of 150 trained and experienced personnel of RAC and they are stationed at Kota, Jodhpur and Jaipur with effective strength of 50 each. The force has been provided with expertise training and equipment to serve as state's response team during disasters.

8. Centre for Disaster Management

A Centre for Disaster Management, located in the State Administrative Training Institute (ATI), Jaipur, has been given the responsibility of capacity building in the State. It organises Trainings of Trainers (Tot) and other stakeholders and also serves as a centre of knowledge and documentation for DM in the State.

9. District Disaster Management Authority (DDMA)

The DDMA is headed by the District Collector to act as the planning, coordinating and implementing body for DM at the district level and take all necessary measures for the purposes of DM in accordance with the guidelines laid down by NDMA and SDMA. It has the responsibility to prepare the District DM Plan for the district.

10. Local Authorities

Local authorities, consisting of Panchayati Raj Institutions (PRIs), Municipalities, District and Cantonment Boards and Town Planning Authorities, which control and manage civic services, have the responsibility to ensure capacity building of their officers and employees for managing disasters, carrying out relief, rehabilitation and reconstruction activities in the affected areas. They have their own DM Plans as per the guidelines of NDMA, SDMA and DDMA.

At the district level, DDMA would act as the district planning, coordinating and implementing body for disaster management and would take all measures for the purposes of disaster management in the District in accordance with the guidelines laid down by NDMA and SDMA.

11. Nodal Departments

The State Government has designated disaster specific Nodal Departments for efficient management of disasters. The list is as follows:-

Table 1-1: Nodal Departments

Sr. No	Nodal Department	Hazards/ Disasters
1	Disaster Management and Relief	Drought, Hailstorm, Heat and Cold wave, Thunder and Lightning, Cyclone
2	Energy	Disaster involving power generation/ distribution/ transmission
3	Home	Terrorist attack, police Mutiny, Major Law and Order crisis, Nuclear, Chemical and Biological and Nuclear and Radiological disaster; Air, Road and Rail Accidents, Festive related disaster,
4	Water Resource	Floods, Flash Floods, Dam burst and Cloudbursts
5	Public Works Department (PWD)	Earthquake. Major building collapse, Landslide
6	Mines & Petroleum	Mine fire and mine flooding, Oil Spill
7	Industries	Chemical and Industrial
8	Urban Development and Housing (UDH)	Urban Fires
9	Revenue	Village Fire and Boat Capsizing
10	Forest	Forest Fire
11	Medical Health	Biological and Epidemic, Food poisoning
12	Agriculture	Pest Attack
13	Animal Husbandry	Epidemic in Animal Population

The key responsibilities of Disaster Management amongst different departments/ agencies of the state government are:

Planning: development of strategies and requirement analysis for resource utilisation. Plan for establishment of structures, development of systems, and to test and evaluate organizational capacity to perform as per allotted roles.

Coordinated Execution of Plans: Increased coordination, convergence and synergy among the departments and institutions should be promoted in order to endorse sharing of resources, perspectives, information and expertise through support of training centres, academic and applied research, education, and awareness generation programmes, etc.

Mainstreaming DM Concerns into Development Programmes: This deals with integration of measures for prevention of disasters and mitigation into developmental plans and projects including mitigation projects and to facilitate provision of adequate funds for DM. Plans may be shown in three broad categories, viz. short, medium, and long term. The structural and non-structural measures to be taken may be brought out in each category.

State Disaster Management Policy in Rajasthan

Government of Rajasthan has undertaken a comprehensive approach towards establishing the state disaster management policy. As a first step it has constituted the:

- State Disaster Management Authority vide notification No.F.8(4)DN&R/DM/03/19360 dated 6/9/2007 under the chairmanship of the Honb'le Chief Minister. The SDMA is the apex body for formulation of plans and policies of the state. It also approves Disaster Management Plans, coordinates the implementation of SDMP provides for prevention,mitiogation and preparedness measures and reviews the development plans of different departments of the state government.

-Following this the State Executive Committee (SEC) has been constituted vide order no.F.8(4)DM& R/DM/03/21141 dated 15/10/2007 under the chairpersonship of Chief Secretary to assist the state authority in performance of its functions. The SEC is to coordinate/supervise the implementation of national/state policies and plans of disaster management.

- District Disaster Management Authority has been established vide notification F.8 (4)DM & R/DM/03 dated 06/92007 for all the districts.DDMA will formulate DM plan at the district level and ensure compliance of the NDMA/SDMA/SEC for prevention,mitigation,response at the district level by the concerned departments.

- State Disaster Response Force has been constituted and would function under the control & supervision of the Home department. Members of SDRF would be given specialised training and would be equipped with modern equipments to deal with different types of disaster like floods, earthquake, CBRN etc.Emphasis would be given to train women to take care of the special needs of women and children.

- Centre for Disaster Management (CDM) located at HCM RIPA,Jaipur and the Police training college at Kishangarh have been identified for capacity building of functionaries in disaster management.

- Besides the above, Rajasthan Rahat Kosh has also been formed vide notification no.F1(2)DM&R/misc/2000/1017-65 dated 20/01/2006 for providing relief in those natural calamities that are not covered or permissible under the Calamity Relief Fund (SDRF). A State level Committee has been constituted for the operation/management of this fund under the chairmanship of the Chief

Secretary.ACS(Development), ACS(Finanace), PrinicipalSecretaries/Secretaries of, Medical Health, Agriculture, Animal Husbandry, Mines Departments as members and Secretary DM& R as Member Secretary of the committee.

Chapter 2 - State Profile

Geography

Rajasthan is the largest State of India with a land area of 342,239 sq km. It lies between 23^0 3' – 30^0 12' N latitude and 69^0 30' – 78^0 17'E longitude with Tropic of Cancer passing through the southernmost district of the state. The state stretches 826 km from North (Sri *Ganganagar district*) to South (*Banswara district*), and 869 km from East (*Dholpur district*) to West (*Jaisalmer district*). The overall length of the state boundary is 5,920 km, of which 1,070 km is the strategically important international border with Pakistan. The State shares its boundary with Gujarat, Madhya Pradesh, Uttar Pradesh, Haryana, and Punjab. It also shares its border with Pakistan having Barmer, Jaisalmer, Bikaner, and Sri Ganganagar districts as the border districts.

Sixty percent of the state falls under the Thar Desert, which is situated in western Rajasthan. The state occupies 10% of the total area and 6% of the total population of the country.

The state has 10.6% of the cultivable land of the country while it has only 1% of the country's water resources.

Administration

Administratively, the State is divided into 7 revenue divisions, 33 districts, and 244 Tehsils. It has 33 Zila Parishads, 249 Panchayat Samities, and 9,168 Gram Panchayats.

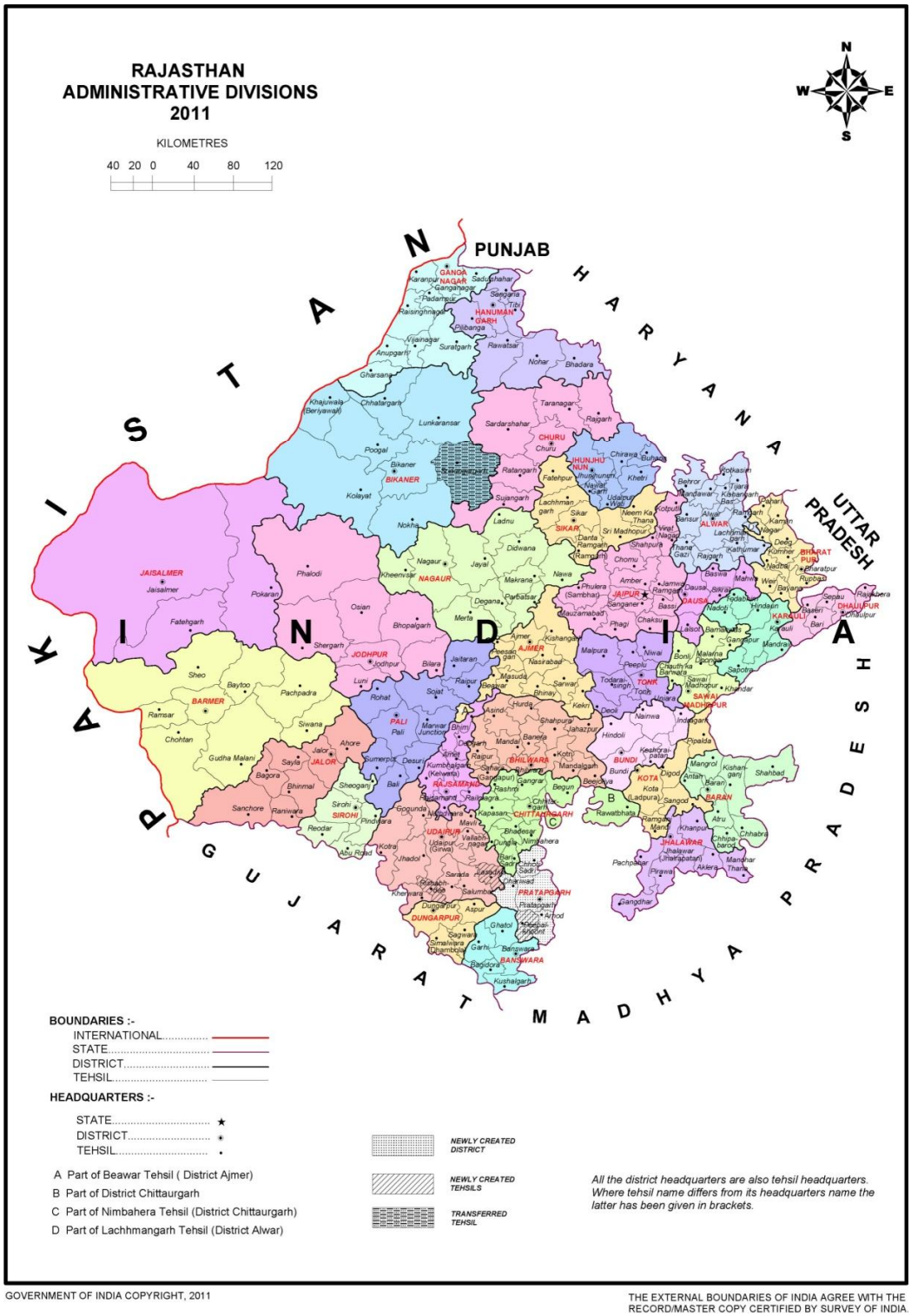

Figure 2-1: Administrative boundaries (Census of India, 2011)

Demography

The table below shows the district wise population, population density, sex ratio, literacy rate and percentage of decadal growth in Rajasthan from 2001 to 2011.

Table 2-1: Demographic Highlights[1],[2]

CENSUS OF INDIA 2011
PROVISIONAL POPULATION TOTALS-RAJASTHAN-DATA SHEET
Directorate of Census Opearations Rajasthan

District Code	State/ District	Total Population	Males	Females	Percentage Decadal Growth 2001-2011	Sex Ratio	Density (persons per sq. km.)	Child Population 0-6 Years	Child Sex Ratio (0-6 Years)	Literacy rate Persons	Literacy rate Males	Literacy rate Females
08	Rajasthan	68621012	35620086	33000926	21.44	926	201	10504916	883	67.06	80.51	52.66
01	Ganganagar	1969520	1043730	925790	10.06	887	179	252376	854	70.25	79.33	60.07
02	Hanumangarh	1779650	933660	845990	17.24	906	184	232933	869	68.37	78.82	56.91
03	Bikaner	2367745	1243916	1123829	24.48	903	78	394396	902	65.92	76.90	53.77
04	Churu	2041172	1053375	987797	20.35	938	148	313852	896	67.46	79.95	54.25
05	Jhunjhunun	2139658	1097390	1042268	11.81	950	361	285395	831	74.72	87.88	61.15
06	Alwar	3671999	1938929	1733070	22.75	894	438	580388	861	71.68	85.08	56.78
07	Bharatpur	2549121	1357896	1191225	21.39	877	503	430833	863	71.16	85.70	54.63
08	Dhaulpur	1207293	654344	552949	22.78	845	398	215567	854	70.14	82.53	55.45
09	Karauli	1458459	784943	673516	20.94	858	264	239449	844	67.34	82.96	49.18
10	Sawai Madhopur	1338114	706558	631556	19.79	894	297	198777	865	66.19	82.72	47.80
11	Dausa	1637226	859821	777405	23.75	904	476	256802	859	69.17	84.54	52.33
12	Jaipur	6663971	3490787	3173184	26.91	909	598	914327	859	76.44	87.27	64.63
13	Sikar	2677737	1377120	1300617	17.04	944	346	375752	841	72.98	86.66	58.76
14	Nagaur	3309234	1698760	1610474	19.25	948	187	498585	888	64.08	78.90	48.63
15	Jodhpur	3685681	1924326	1761355	27.69	915	161	592959	890	67.09	80.46	52.57
16	Jaisalmer	672008	363346	308662	32.22	849	17	130400	868	58.04	73.09	40.23
17	Barmer	2604453	1370494	1233959	32.55	900	92	499328	899	57.49	72.32	41.03
18	Jalor	1830151	937918	892233	26.31	951	172	313808	891	55.58	71.83	38.73
19	Sirohi	1037185	535115	502070	21.86	938	202	171699	890	56.02	71.09	40.12
20	Pali	2038533	1025895	1012638	11.99	987	165	293002	895	63.23	78.16	48.35
21	Ajmer	2584913	1325911	1259002	18.66	950	305	374745	893	70.46	83.93	56.42
22	Tonk	1421711	729390	692321	17.33	949	198	200963	882	62.46	78.27	46.01
23	Bundi	1113725	579385	534340	15.70	922	193	158088	886	62.31	76.52	47.00
24	Bhilwara	2410459	1224483	1185976	19.27	969	230	356230	916	62.71	77.16	47.93
25	Rajsamand	1158283	582670	575613	17.89	988	302	173944	891	63.93	79.52	48.44
26	Dungarpur	1388906	698069	690837	25.39	990	368	239608	916	60.78	74.66	46.98
27	Banswara	1798194	908755	889439	26.58	979	399	321288	925	57.20	70.80	43.47
28	Chittaurgarh	1544392	784054	760338	16.09	970	193	209376	903	62.51	77.74	46.98
29	Kota	1950491	1023153	927338	24.34	906	374	248585	889	77.48	87.63	66.32
30	Baran	1223921	635495	588426	19.82	926	175	179496	902	67.38	81.23	52.48
31	Jhalawar	1411327	725667	685660	19.57	945	227	204140	905	62.13	76.47	47.06
32	Udaipur	3067549	1566781	1500768	23.63	958	242	499072	920	62.74	75.91	49.10
33	Pratapgarh*	868231	437950	430281	22.84	982	211	148753	926	56.30	70.13	42.40

*For calculation of sex ratio others are included in males

Socio-cultural significance

Rajasthan is an exotic and diverse state with a blend of people with different customs, cultures, costumes, cuisines, manners and history. The state is known for its forts, palaces and boasts a rich cultural heritage. It is also known for its precious and semi-precious stones and unique hand-crafted jewellery.

Climate

The climate of Rajasthan varies from arid to semi-arid. On an average, summer temperatures range from 25° to 46° C. At times, temperatures touch a maximum of 49° C creating hypothermic conditions in the state. On an average, the winter

[1] *Source: http://censusindia.gov.in*
[2] *Census of India*

temperatures range from 8° to 28° C which drops to -2° C creating wind-chill effects in some parts of the state.

The state has an average normal rainfall of 531 mm in comparison with the national average of 1,200 mm. The rainfall pattern also varies in the different parts of the state. Western Rajasthan receives an annual average rainfall of 279 mm, while the eastern Rajasthan receives an annual average rainfall of 631 mm.

Topography

The geography of Rajasthan is enriched with variable topographic features. The dry and the parched region are predominant in the major portions of the state. The main features of topography are rolling sand dunes, river-drained plains, rocky terrain, wetlands, plateaus, barren tracks or land filled with the thorny shrubs, wooded regions and ravines.

The topography of Rajasthan is divided into the following regions:

- The Aravalli and other hilly regions
- The Thar and other arid regions
- The plateaus including the Malwa and Vindhya
- The fertile plains such as the Mewar
- The forest regions
- The water bodies such as rivers and salt lakes

The Aravalli range runs across the state from southwest Guru Peak (Mount Abu), which is 1,722 m in height to Khetri in the northeast. This divides the state into 60% in the northwest of the lines and 40% in the southeast. The northwest tract is sandy and unproductive with little water but improves gradually from desert land in the far west and northwest to comparatively fertile and habitable land towards the east. The area includes the Great Indian (Thar) Desert.

The south-eastern area, higher in elevation (100 to 350 m above sea level) and more fertile, has more diversified physical features. In the south lies the hilly tract of Mewar. In the southeast a large area of the districts of Kota and Bundi forms a tableland, and to the northeast of these districts is a rugged region (badlands) following the line of the Chambal River. Further north, the country levels out; the flat plains of north-eastern Bharatpur district are part of the alluvial basin of the Yamuna River[3].

[3] *www.indfy.com, www.123incredibleindia.com*

Environment and Ecology

Water resources

Surface water

Rajasthan has only 1.16 percent of country's surface water. Average rainfall is 531 mm against national average of 1200 mm. Two-thirds of the state is desert where the average rainfall is only 380 mm. Total surface water available at 50% dependability is 21.71 BCM, out of which only 16.05 BCM is techno economically utilizable, but storage capacity generated as yet is 11.29 BCM only, which is about 71%. Rest of the water is yet to be harnessed. Rajasthan receives 18.08 BCM water as per interstate agreements. Irrigation potential of 34 lac. ha. has been created against the ultimate potential of 51 lac ha.

The Chambal river, which is the only large and perennial river in the State, originates from its drainage to the east of this range and flows northeast. Its principal tributary, the Banas, rises in the Aravalli near Kumbhalgarh and drains the Mewar plateau. Further north, the Banganga, after rising near Jaipur, flows east-wards before disappearing. The Luni is the only significant river west of the Aravalli. It rises in the Pushkar valley of Ajmer and flows 320 km west-southwest into the Rann of Kachchh. Northeast of the Luni basin, in the Shekhawati tract, is an area of internal drainage characterized by salt lakes, the largest of which is Sambhar Salt Lake.

Ground water

The ground water condition is quite alarming. The condition has deteriorated very fast in the last two decades. The stage of groundwater exploitation, which was just 35% in the year 1984, has reached a level of 138% in 2008. Out of 249 blocks in the state, only 30 blocks come under the safe category. This calls for immediate remedial measures to address the critical water resources situation in the state[4].

Hydrogeology

The State can be divided into three hydro geological units, namely, unconsolidated sediments, semi-consolidated sediments, and consolidated rocks. The unconsolidated sediments are of two types: alluvial sediments and aeoline deposits. The Alluvial deposits are confined to Barmer, Jalore and Jodhpur district, consisting of sand, clay, gravel and cobbles. Valley fills have been reported from Jhunjhunu, Ajmer, Bhilwara, and Udaipur district. The Aeoline sediments constitute one of the major aquifers east of major fault, east of Bikaner. It occupies an area of 1400 sq.km. The aquifer thickness is 40 to 80 m. The yield of wells ranges from 100 to 150 m^3/hr. Semi-consolidated formations include sandstones, lime stones and Aur beds, covering Jaisalmer and Barmer districts. The dug wells in Jaisalmer limestones yield 13 to 68 m^3/day. The yield of wells in Lathi sandstone varies from 50-150 m^3/hr. The consolidated rocks include gneiss, granites, schist, phyllites, marble and Vindhyan sandstones, limestone, quartzite and basaltic flows, mostly restricted to

[4] *State Water Policy, State Water Resource and Planning Department, Government of Rajasthan*

the eastern part of the State. The yield prospect is limited unless the well is located near major lineaments or any other weak planes. The ground water quality is in general poor (brackish to saline) at deeper levels.

Table 2-2: Ground water resources of Rajasthan

Dynamic Ground Water Resources	
Annual Replenishable Ground water Resource	11.56 BCM
Net Annual Ground Water Availability	10.38 BCM
Annual Ground Water Draft	12.99 BCM
Stage of Ground Water Development	125 %
Ground Water Development and Management	
Over Exploited	140 Blocks
Critical	50 Blocks
Semi- critical	14 Blocks
Ground Water User Maps	32 districts
Artificial Recharge to Ground Water (AR)	▪ Area identified for AR: 39120 sq km ▪ Quantity of Surface Water to be Recharged: 861 MCM ▪ Feasible AR structures: 3228 percolation tanks, 1291 anicuts, 2871 recharge shafts, RTRWH structures (4 lakh houses)

(Source: http://cgwb.gov.in/gw_profiles/st_Rajasthan.htm)

Desert:

Rajasthan desert is a greater part of the Thar Desert that is spread across the western part of India and south-eastern Pakistan. The Thar Desert embraces the districts (Rajasthan) of Jaisalmer, Barmer, Bikaner, Churu, Nagaur, Sirohi, Jalore, and Jodhpur. Thus, this huge stretch of barren land extends into the southern part of Haryana, Punjab and northern Gujarat and the Sind province of Pakistan. The desert in Rajasthan is bounded by the Sutlej river in the northwest, the Aravalli mountains in the east and the salty marshland of the Rann of Kutch in the south and the Indus river in the west.

Hillocks, salty marshlands, gravel, shifting sand dunes, fragments of rocks, scrub vegetation and rare oasis are scattered over the vast sandy expanse of the Thar Desert in Rajasthan. Luni is the only river that meanders through the desert and reaches the Arabian Sea through the Rann of Kutch.

Soil and Vegetation

In the vast sandy north-western plain extending over the districts of Jaisalmer, Barmer, Jalore, Sirohi, Jodhpur, Bikaner, Ganganagar, Jhunjhunu, Sikar, Pali, and Nagaur, soils are predominantly saline or alkaline. Water is scarce but is found at a depth of 30 to 61 m. The soil and sand are calcareous (chalky). Nitrates in the soil increase its fertility, and, as has been shown in the area of the Indira Gandhi (formerly Rajasthan) Canal, cultivation is often possible where adequate water supplies are made available.

The soils in the Ajmer district in central Rajasthan are sandy; clay content varies between 3 and 9 per cent. In the Jaipur and Alwar districts in the east, soils vary from sandy loam to loamy sand. In the Kota, Bundi, and Jhalawar tract, they are in general black and deep and are well drained. In Udaipur, Chittaurgarh, Dungarpur, Banswara, and Bhilwara districts, eastern areas have mixed red and black, and the western areas have red to yellow soils. Other types of soils found in Rajasthan are loamy, clay, nitrogenous soil and the black lava soil. Due to very low rainfall, the seasonal vegetation includes a few grass species, dwarf trees and shrubs. The black lava soil in the hilly tracks of the Aravalli is ideal for the growth of sugarcane and cotton. The food crops are grown in the plains, which are drained by streamlets and rivers[5].

Forests

Rajasthan state is largely arid for the most part. Only 9.5 % of the state's total geographical area is recorded as forest.

The forests of Rajasthan are spread unequally in the northern, southern, eastern and south-eastern parts. The total reserved and protected forest areas are 12,453.92 and 17,415.00 sq. Km respectively and the unclassified forest constitutes about 2,768.86 sq.km.

The extent of Natural Forests in Rajasthan is not only one of the lowest in the country but also low in terms of forest productivity. On the contrary, the State is endowed with the largest expanse of wasteland, which is about 20% of the total wastelands of the country

Flora and Fauna

The flora and fauna in Rajasthan are specifically endemic to the dry region and they are adapted to survive in Rajasthan's water-scarce and arid regions. The forest vegetation includes the grasses, shrubs and thorny trees. The commonly found tree species in Rajasthan are bamboo, khejri, teak and varied species of acacia. Some of the national parks have several species of plants and herbs, having great medicinal

[5] *www.indfy.com, www.123incredibleindia.com*

value. The fauna of Rajasthan contains about 25 species of serpents and 23 species of lizards. The wildlife in Rajasthan includes species like Indian gazelles or chinkaras, antelopes, black bucks, silver foxes, great Indian bustards, the Nilgai , and wild cats.

Economy

The Gross State Domestic Product (GSDP), Net State Domestic Product (NSDP), and Per Capita Income (PCI) are key parameters to assess the economic performance of the state during a specific period of time. The estimates of these parameters are prepared both at current and constant (1999-2000) prices. These parameters also reveal the extent and direction of the changes in the levels of economic development in the state. The trend of the past few years (2005-10) indicates an upward trend in the GSDP/NSDP and PCI both at current and constant prices in the state (State Economic Review, 2009-10).

The State GSDP estimates at current price and constant prices for the year 2009-10 show an increase of 8.97% and 2.51% respectively over the previous year. For NSDP, these increases turn out to be 8.80% and 2.21% respectively. The PCI estimates at Rs 28,885 at current price (2009-10) also show an increase of 6.98% over the previous year (State Economic Review, 2009-10).

Agriculture and allied sector

The Agriculture and allied sector plays a significant role in the State economy. It includes the agriculture, animal husbandry, forestry, and fishing sectors, which contributes about 20 to 34 % to the State's economy (State Economic Review, 2009-10). Agriculture in Rajasthan is mostly dependent on rainfall that mostly remains scanty, low and irregular. Despite low rainfall, Rajasthan is among the largest producers of edible oils in the country and the second largest producer of oilseeds. Rajasthan is also the biggest wool-producing state in the country. The main food grain crops of the state are maize, wheat, rice, jawar, bajra and pulses. The other main agriculture products include oilseeds, groundnut and vegetables. Rajasthan is known for its spice production. The chilly of Mathania is famous throughout India. The Pushkar region of Rajasthan is renowned for its horticulture and produces Rose flowers. The state also produces herbs and aromatic products.

Industrial sector

The Industrial sector also plays a significant role in the State economy. It includes mining, quarrying, manufacturing, utilities such as electricity, gas and water supply, and the construction sector. Together these sectors contribute about 26 to 30 % to the State's economy (State Economic Review, 2009-10). The mineral-rich State is fast emerging as a prominent industrial destination in the country. Major industries are textiles and woollens, sugar, cement, glass, sodium plants, dyes, pesticides, zinc, fertilizers, railway wagons, ball bearings, water and electricity metres, television sets, synthetic yarn, and insulating bricks.

Figure 2-2: Industrial (CBRN) Areas in the State;

Public Sector Undertaking (PSUs)

There are 9 PSUs in Rajasthan. These are:

1. FCI Aravalli Gypsum and Minerals (India) Ltd
2. Hindustan Salts Ltd.
3. IL Power Electronics Ltd.
4. Instrumentation Digital Control Ltd.
5. Instrumentation Ltd.
6. Rajasthan Drugs and Pharmaceuticals Ltd.
7. Rajasthan Electronics and Instruments Ltd.
8. Sambhar Salts Ltd.

9. Instrumentation Control Valves Ltd.

Geology and Mines

General Geology: Geologically, Rajasthan comprises rocks from the oldest Archean rocks to recent alluvium formations. The oldest formations are known as Banded Gneissic Complex exposed in central and southern Rajasthan. The Aravalli hill range is made up of Precambrian rocks of Aravalli and Delhi Super group comprising the metamorphosed gneisses, schists, marble, quartzite, calc silicate and ultra basic and acidic intrusive rocks, trending NE-SW and dipping 30° to 70° easterly. This is known as the Delhi fold belt and is an important horizon for base metals, and other metallic and non-metallic minerals.

The eastern and south-eastern parts of the State are occupied by rocks of the Vindhyan Super group mainly forming a plateau of sandstone, shales and limestone. In the southern part, Deccan trap formation of cretaceous age are exposed.

The Aravalli metallogenic province of Rajasthan is the most important geological province for base metals and gold deposits. The province contains the world class Rampura-Agucha Lead-Zinc deposit along with several large deposits of Lead and Zinc in the Rajpura-Dariba and Zawar belts. In addition, there are a number of deposits in the Deri-Basantgarh belt. Since the last decade, several gold deposits have been proved in the southern part of the province in Banswara district.

Mineral Potentiality: The State is geologically a veritable repository of minerals. There are about 64 different kinds of major and minor minerals produced in the State, contributing an annual revenue of more than Rs. 600 crores.

Rajasthan is the sole producer of garnet (gem variety), jasper and wollastonite. Almost the entire production of zinc (concentrate), calcite, asbestos and gypsum in the country was reported from Rajasthan. Besides, Rajasthan is the leading producer of ball clay (40%), feldspar (70%), fluorite (graded) (59%), Kaolin (44%), lead concentrate (80%), ochre (72%), phosphorite (79%), silver (54%), steatite (85%), barytes (53%), copper (34%), quartzite (33%) and silica sand (21%)[6].

Petroleum

Rajasthan has a significant resource potential of hydrocarbons under 4 Petroliferous Basins. Due to hydrocarbon potentiality, 3 Petroliferous Basins of Rajasthan have been upgraded into Category-I, i.e., equivalent to Bombay High, Assam and Gujarat. These 4 basins falls in the 13 Districts of the State, namely, Barmer, Jaisalmer, Bikaner, Ganganagar, Hanumangarh, Jalore, Jodhpur, Kota, Jhalawar, Baran, Bundi, Chittorgarh and Sawai Madhopur spread over an area of 1,50,000 Sq.km. The State Government has sanctioned 10 Petroleum Mining Leases (covering an area of 4,000 sq.km) for exploitation of crude oil, heavy oil and natural gas in these regions[7].

[6] *http://www.dmg-raj.org/*
[7] *http://petroleum.rajasthan.gov.in/landmark.asp*

Services sector

The state economy also depends to a very large extent on the tourism sector which accounts for almost 15% of the state's economy[8]. Endowed with natural beauty and a great history, tourism is flourishing in Rajasthan. The palaces of Jaipur, lakes of Udaipur, and desert forts of Jodhpur, Bikaner and Jaisalmer are among the most preferred destinations for domestic and international tourists. Many old and neglected palaces and forts have been converted into heritage hotels. Tourism has increased employment in the hospitality sector. A spin-off of tourism has been the growth of the handicrafts industry. The service sector also includes transport, communication, trade, hotels and restaurants, banking and insurance, real-estate, business services, public administration, and other services sectors. These collectively contribute about 40% to 50% to the State's economy (State Economic Review, 2009-10).

Infrastructure

Transport

Infrastructure forms the pillars of a state economy and plays a crucial role in its growth. A strong base culminates in rapid progress and rich coffers. A roadway forms an important component of the infrastructure.

The total road length in the state of Rajasthan is 1, 86,086 km out of which 1, 12,717 km is with PWD, Rajasthan. This includes National Highways, State Highways, major district roads, other district road and village roads. There are 20 National Highways passing through the state of Rajasthan. The total length of these is 5,722 km, out of which for the present 1,447 km has been transferred to NHAI.

Power

The total installed generation capacity in the State is 7,716.63 MW of which the state generates about 4,820.30 MW; 3,847 MW from state sector projects (RVUN), and 972.95 MW from partnership projects. The state also gets 1,878.18 MW power from the central government. Apart from conventional power generation, the state also generates 883.145 MW power from non conventional sources like wind (851.84 MW) and Biomass (31.30 MW) respectively[9].

[8] *http://business.mapsofindia.com/india-state/rajasthan-economy.html*

[9] *A note on power sectors in Rajasthan, Energy Ministry, Government of Rajasthan – 31.12.10*

Figure 2-3: Major Power Plants in the State;

According to a report by the India Meteorological Department, the highest annual global radiation is received in Rajasthan (Solar installation ranging between 6-6.4 Kwh/m^2/day in about half of Rajasthan). Therefore, large areas of barren and sparsely populated land make them suitable locations for large central power stations based on solar energy.

Indira Gandhi Nahar Pariyojana (IGNP)

The IGNP is the largest desert area irrigation system in the world. Construction of IGNP was started in 1960 after the signing of the Indus Water Treaty with Pakistan through which India became entitled to the exclusive use of the three eastern rivers of the Indus system: the Ravi, Beas and Sutlej. The canal system in IGNP consists of a 204 km long feeder canal, a 445 km long main canal, and about 9,060 km of distribution canals built, under construction or planned. The total proposed

command area of the canal is 16.17 lac hectares . About 37 lac tonnes of agriculture produce is expected per annum. The IGNP provides drinking water to 3,461 villages across eight districts of western Rajasthan.

Water Supply, Sanitation and Sewerage System

The following are the details of piped water supplies in the state[10].

Table 2-3: Water supply scenario

State	Total Habitations	Not covered	Partially covered	Fully covered
Rajasthan	**1,21,133**	**37,669 (31%)**	**16,764 (14%)**	**66,700 (55%)**

Health

Although the overall health scenario in the state is considered to be satisfactory, much still remains to be improved. The comparative figures of major health and demographic indicators are as follows:

Table 2-4: Demographic details

S. No.	Item	Rajasthan	India
1	Crude Birth Rate (SRS 2008)	27.5	**22.8**
2	Crude Death Rate (SRS 2008)	6.8	**7.4**
3	Total Fertility Rate (SRS 2008)	3.3	**2.6**
4	Infant Mortality Rate (SRS 2008)	63	**53**
5	Maternal Mortality Ratio (SRS 2004 - 2006)	388	**254**
6	Sex Ratio (Census 2011)	926	**940**

The health infrastructure under the public sector in the state is given in the following table:

[10] *Water supply scenario as of 26 Nov 2010*

Table 2-5: Health Care Facilities

Particulars	In position
Sub-centres	10742
Primary Health Centres	1503
Community Health Centres	349
Multipurpose workers (Female) / ANM at Sub Centres and PHCs	12271
Health Workers (Male) MPWs(M) at Sub Centres	2528
Health Assistants (Female) / LHV at PHCs	1358
Health Assistants (Male) at PHCs	714
Doctors at PHCs	1542
Obstetricians and Gynaecologists at CHCs	110
Physicians at CHCs	241
Paediatricians at CHCs	71
Total specialists at CHCs	651
Radiographers	269
Pharmacists	2355
Laboratory Technicians	2065
Nurses/Midwives	8425

The other Health Institutions in the State are as follows:

Table 2-6: Health Institutions

Health Institution	Number

Medical Colleges	10
District Hospitals	33
Ayurvedic Hospitals	100
Ayurvedic Dispensaries	3539
Unani Hospitals	3
Unani Dispensaries	102
Homeopathic Hospitals	9
Homeopathic Dispensaries	178

Education

There has been a leap in the literacy rate in the last ten years. The literacy rate has grown from 61% in 2001 to over 67% in 2011. Primary education is free and mandatory for all children in the state.

At present, the state has nine universities and more than 250 colleges, 55,000 primary and 7,400 secondary schools.

There are 41 engineering colleges at present, with an annual enrolment of about 11,500 students. There are 23 polytechnics and 152 Industrial Training Institutes (ITIs) that impart vocational training.

The state has 10 medical colleges (3 in the private sector, 1 in PPP model, and 6 in the government sector) with an annual intake of 700 students. There are 8 dental colleges in the state with an intake of 740 students.

Apart from these, there are 28 pharmacy institutes where 1,600 students are enrolled annually. Rajasthan also has 26 Management Institutes with about 1,460 seats.

Chapter 3 - Hazard Vulnerability and Risk Analysis (HVRA)

Concept of Hazard Vulnerability and Risk (HVR)

It is evident from the events such as the Indian Ocean Tsunami in 2004, the Kashmir Earthquake in 2005, the Kosi Floods in 2008, the Haiti Earthquake of 2009 and the earthquake in Japan on 11 March 2011 followed by a tsunami, which also triggered a nuclear disaster that there has been an increasing frequency of disasters and corresponding losses of human lives and property worldwide. Often, human activities multifariously are exposed to these natural events, thus making communities vulnerable to these events. For instance, the tsunami in Japan triggered a nuclear disaster by damaging the Fukushima Nuclear plant in which communities were exposed to a severe level of radiation.

It is, therefore, essential to understand and study the hazards prevailing in areas and the corresponding risks and vulnerabilities caused by them. Based on these studies, strategies and action plans for preparedness, prevention and mitigation need to be made to reduce the impact of disasters.

Hazard Assessment

"Hazard is an event or occurrence that has the potential to cause damage to life, property and environment. Hazard assessment is the process of studying the nature of hazards determining its essential features i.e., degree of severity, duration, and the extent of the impact area.

Risk Assessment

Risk has been defined by the United Nations as a measure of the expected losses due to a hazard event of a particular magnitude occurring in a given area over a specific time period. The level of risk depends upon the nature of the hazard, the vulnerability of the elements that are affected and the economic value of those elements. Risk is also defined as a probability that negative consequences may arise when hazards interact with vulnerable areas, people, property, and environment.

Risk analysis is a methodology to determine the nature and extent of risk by analyzing potential hazards and evaluating existing conditions of vulnerability that together could potentially harm exposed people, property and environment on which they depend[11].

Therefore, Risk assessment is a function of hazard and vulnerability and is often based on an assumption and uncertainty, which contains some degree of errors.

Vulnerability Analysis

[11] *UNISDR*

The vulnerability of a particular element of community is defined as the degree of loss, which it would suffer as a result of a specific hazard event. The nature of vulnerability and its assessment vary according to whether the element involved represents people and social structures, physical structures, or economic assets and activities. Therefore, the vulnerability of an area is determined by the capacity of its social, physical and economic structures to withstand and respond to hazard events.

HVRA is considered to be the first step towards Disaster Risk Reduction (DRR). Risk assessment studies have both spatial and temporal dimensions. Thus, there is a need to decide the scale at which the risk assessment is to be conducted with reference to the timeline for it. The risk maps thus need updation on regular intervals.

HVRA is essential to develop a strong and effective plan; which would focus on the preparedness, prevention, mitigation, and response and recovery measures. The DM Act 2005 has emphasized on the importance of conducting HVRA to identify the risks and vulnerabilities.

District wise HRVA would be conducted by the respective DDMAs. Hazard assessment is concerned with the properties of the hazard itself. The Vulnerability Atlas of India, developed by BMTPC, Govt of India, would be referred to as the baseline for all analysis. The State Disaster Management Authority would take all appropriate steps to complete a comprehensive hazard assessment of the State.

Hazard Analysis – Primary Hazards

Droughts

Low rainfall coupled with erratic behaviour of the monsoon in the state makes Rajasthan the most vulnerable to drought. Of all the natural disasters, drought can have the greatest impact and affect the largest number of people and livestock. Drought invariably has a direct and significant impact on food production and the overall economy. Drought, however, differs from other natural hazards. Because of its slow onset nature, its effects may accumulate over time and may linger for many years. The impact is less obvious than for events such as earthquakes or flood but may be spread over a larger geographic area. Because of the pervasive effects of drought, assessing its impact and planning assistance becomes more difficult than with other natural hazards.

The State Drought Monitoring Cell (SDMC) in collaboration with the Agriculture, Animal Husbandry, and Water Resources departments, and the National Crop Forecasting Centre (NCFC) would carry out assessment of expected damage which would include impact on agricultural production, depletion of water resources, impact on livestock population, land degradation and deforestation as well as human health.

The Department of Agriculture and Cooperation in collaboration with the SDMC and NCFC would standardize the Unit of deceleration of drought and would evolve alternative methods of quicker assessment of crop yield to mitigate the impact of drought in time.

SDMC would facilitate the integration of data and expertise from multiple institutions such as ICAR, NRSC, IMD, Agricultural Universities, State Departments of Irrigation, Ground

Water, Revenue, Agriculture, Animal Husbandry etc., to evolve a robust method for drought intensity assessment. Once the indicators cross the defined threshold level (level to be decided by the state), the SDMA Secretariat would help in declaring drought at sub-district levels.

Earthquakes

As per the BMPTC Atlas, various parts of the State of Rajasthan fall under earthquake zones II, III, and IV.

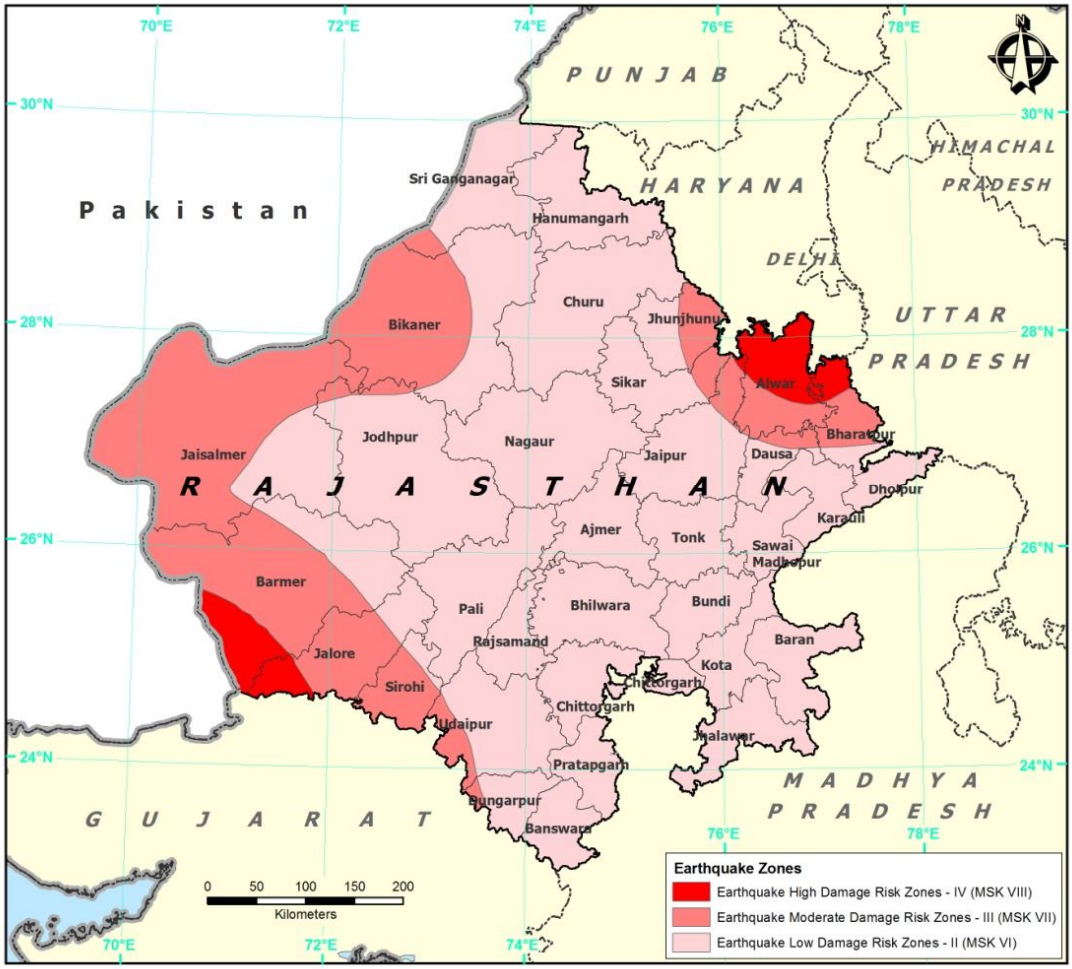

Figure 3-1: Earthquake zones; source IS 1893: 2001

Table 3-1: Classification of districts according to seismic zones

S. No.	Seismic Zone	Intensity MSK	Magnitude	District
1	IV [High Damage Risk Zone]	VII-VIII	6.0 - 6.9	Some parts of Barmer [Chohtan Block], Jalore [Sanchore Block] Alwar [Tijara Block], and Bharatpur [Block Nagar, Pahari]
2	III [Moderate Damage Risk Zone]	VI-VII	5.0 - 5.9	Some parts of Udaipur, Dungarpur, Sirohi, Barmer, Jaisalmer, Bikaner, Jhunjhunu, Parts of Sikar, Jaipur, Dausa, and Bharatpur.
3	II [Low damage Risk Zone]	IV-VI	4.0 - 4.0	Ganganagar, Hanumangarh, Churu, Jodhpur, Pali, Rajasamand, Chittorgarh, Jhalawar, Baran, Kota, Bundi, Sawai Madhopur, Karauli, Dholpur, Banswara, some areas of Bikaner, Udaipur, Jhunjhunu, Sikar, and Jaipur.

(Source: Earthquake Manual, Government of Rajasthan)

On 9 April 2009, an earthquake of 5.3 intensity on the Richter scale struck Jaisalmer and surrounding districts. Eighty-seven structures, including residential and Government buildings, were damaged. A primary school at Charana ki dani village also suffered extensive damage. However, no human causality was reported[12].

The fort of Jaisalmer also developed structural cracks, which poses a threat to people living in and around the fort.

A detailed mapping of seismic fault zones, quantification of probability of experiencing various strengths of ground motion at a site in terms of return period for intensity would be carried out and appropriate regulations would be put in place to decrease the vulnerability of the built environment.

[12] *Damage assessment report, PWD, Jaisalmer District, 2009*

Floods

Though most parts of Rajasthan receive scanty rainfall, the State has a history of floods and inundations, mostly along the basins of rivers like Luni and Chambal. There are 13 river basins in the state viz.: Shekhawati, Ruparail, Banganga, Gambhiri, Parbati, Sabi ,Banas, Chambal, Mahi, Sabarmati, Luni, West Banas, and Sukli. Out of these, Luni, Banas, and Chambal basins are the largest and are divided into several sub basins. While the Luni river flows through parts of Ajmer, Barmer, Jalore, and Jodhpur, its sub basins of Bhund Hemawas, Sukri, Jawai and Bendi cover parts of Pali, Jalore, and Sirohi. Similarly, the Banas basin falls in Udaipur and Bundi districts and its sub basins of Berach, Morel and Mashi cover parts of Chittorgarh and Jaipur districts. Chambal is the largest basin of the State. Along with its sub basins of Kali Sindh and Parwati, it covers parts of Bundi, Kota, Jhalawar and Baran districts.

Figure 3-2: Flood prone area map; source Flood Manual, Rajasthan (Disaster Management and Relief Department)

Figure 3-2 shows the flood prone areas of Rajasthan. These include major parts of the basins and sub basins of River Luni in Barmer, Pali, Sirohi and Jalore; and the basins and sub basins of River Chambal in Baran, Kota and Bundi districts. Also, major portions of Bharatpur districts falling under the basin of River Banganga, and the basins of River Ghaggar in Sriganganagar are prone to floods.

The reasons for flooding in these regions include:

- Excess rain in the catchment
- Sudden release of large quantities of water from Dams/ water reservoirs
- Breach/ damage in major reservoirs/ dams
- Limited holding capacity

Besides the floods in these natural drainage systems, there are other reasons for inundation. Changes in rainfall patterns have also increased the risk of flash floods in many areas that were not flood prone historically. The Barmer flood in 2006 was a revelation and made disaster managers and policy makers take a fresh view of the risks and vulnerability from floods in the State. People living in the low-lying areas of the above-mentioned basins are the most vulnerable to floods.

The flood hazard of the State would be assessed comprehensively by way of analysis of flood return periods, topographic mapping and height contouring around river systems together with estimates of capacities of hydrology systems and catchment areas, analyses of precipitation records to estimate probability of overload and other scientific methods. An analysis of the flood proofing methods currently in place and their lacunae would also be carried out for identification of the flood hazard.

A composite vulnerability/ risk profile of the urban agglomerations and highly disaster prone areas would be developed.

Urban Flooding:

Rapid urbanisation has led to an emerging concern of urban flooding. In urban areas, flooding is primarily due to drainage failures and increased run-off loads on hard surfaces. Filling up of natural drainage channels, urban lakes, storm water drains contribute towards flooding. Besides this, poor water and sewerage management leads to outbreak of epidemics incase of flooding. For example in 1981 heavy rainfall caused flooding in Jaipur, Tonk,Nagaur and Sawai Madhopur and caused extensive damage to property and life.

Hail Storms, Frost and Cloudburst

Hailstorms cause heavy damage to crops and vegetations. Secondary hazards like snapping of electric poles due to uprooting of trees, disruption of communication links, etc. are also attributed to hailstorms[13]. Frost is a regular feature in many parts of Rajasthan and has adverse effects on winter crops.

Though cloudburst is not a regular phenomenon, it leads to exceptionally heavy rainfall and sudden flash floods in streams and rivers, leading to breaching of banks and overflowing of dams.

SEC and DDMA would undertake identification of areas prone to floods along with the names of villages or tehsils/ districts in a scientific manner in collaboration with the National Remote Sensing Agency (NRSA) and Survey of India (SOI).

Sand Storms

Sand storms are typical features of south-western Rajasthan. High velocity winds along with sand, often cyclonic in nature, blow through most of the western districts, particularly in months from March to June. High wind and sand storms severely disrupt the routine life, transportation, electricity and other essential services. High winds also take away the top soil of the land which has vital nutrients for fertility. Livestock are particularly vulnerable to sand storms. It also leads to shifting of sand dunes, and often covers roads, rivers, ponds, and canals with large quantities of sand deposits.

Hazard Analysis - Manmade Hazard

Fire

Urban and Rural Fire

Fires may be caused due to occurrence of earthquakes, explosions, electrical malfunctioning and various other causes. Moreover, fire accidents are also caused many a times due to carelessness in handling LPG cylinders and bursting of crackers, etc.

The State would take up a detailed assessment of fire hazards like preparation of inventories/maps of storage locations of toxic/hazardous substances, assessment of hydrants, provision and regular maintenance of fire fighting equipment, identification of evacuation routes, fail-safe design and operating procedures, planning inputs, transportation corridors etc.

A composite vulnerability/ risk profile of the urban agglomerations and highly disaster prone areas would be developed.

Forest Fires

[13] Rajasthan Disaster Management Manual

Forests are the most important renewable natural resource and play a significant role in human life and environment. Prolonged dry weather and over exploitation have resulted in increased frequency of forest fires causing significant environmental impacts. Recurrence of fire incidents decreases the green cover by preventing regeneration of forests.

Forest fires are common in areas like Kumbhalgarh in Rajsamand district and the forests of Alwar, Sawai Madhopur, i.e., National Parks of Sariska and Ranthambhore are highly vulnerable to forest fires. Forest fires severely affect wild life, environment, and ecology. Many tribal communities also live in and around forest areas. In summers, the incidence of forest fires increases due to high wind velocity and various other reasons. However, there is no history of major casualties in this type of incidents[14].

Government has taken initiatives of monitoring forest fires in Sirohi district through remote sensing applications. This shall be replicated to all other areas of the state.

Oil fires

The exploration activities are undergoing in 13 districts of the State. Barmer and Jalore are the hubs of oil reserves.

Major oil companies have their terminals and depots in the state, i.e., 12 bulk storage depots and terminals, 11 LPG bottling plants, 8 aviation fuel Stations, 239 kerosene/ LDO dealerships, 425 LPG distributors and over 1,967 retail outlets. The major upcoming projects are BPCL's Bina-Kota pipeline and the pipeline from the Bharatpur Depot of Indian Oil to the Mathura Refinery by 2011.

Rajasthan has three Gas fields in Jaisalmer and one oil field in Bikaner-Nagaur operated by Oil India ltd.; while there are five oil fields and two gas fields in Rajasthan being operated by private joint ventures. Total crude oil production in Rajasthan in 2009-10 was 447000 tonne, while production of natural gas was 239 million cubic meter.

The IOC Depot fire incident in 2010 is a grim reminder of how vulnerable these depots could be. With lack of appropriate land use planning and inadequate measures of mitigation, the properties and population living in vicinity of these plants and depots are highly vulnerable.

Chemical, Biological, Radiological, and Nuclear (CBRN) Hazard

Chemical Hazard

Chemical hazards can emanate from various sources such as the hazardous chemical manufacturing industry, hazardous waste generating units, transportation of hazardous materials and improper handling and disposal of hazardous materials.

Rajasthan has 111 units of industries manufacturing one or more hazardous chemicals across 14 districts. The major hazardous chemicals manufactured and stored in these units are: Liquefied Petroleum Gas (LPG- 30 units), High Speed Diesel (HSD- 18 units) and Chorine (46 units). Other hazardous chemicals include: Superior

[14] *Current Science, Vol. 97, No. 9, 10 November 2009*

Kerosene Oil (SKO), Motor Spirit (MS), Phorate Carbofuran, Hydrofluoric Acid (HF), Methyle Parathon, Propane, Naptha, Sulphuric Acid, Hydrochloric Acid (HCL), Ammonia, Ethanol, Gasoline, Ethylene Oxide, Oleum, and Liquid SO3.

Alwar has the maximum number of hazardous chemical manufacturing units (53), most of them manufacturing Chlorine. Other districts include Jaipur (15), Kota (9), Ajmer (6), Jodhpur (6), Bikaner, Sirohi and Udaipur (4 units each), Bharatpur, Chittorgarh, Jhunjhunu and Hanumangarh (2 units each), and Banswara and Baran (1 Unit each)

The Rajasthan State Pollution Control Board (RSPCB) has identified 462 potential hazardous waste generating units in the state out of identified 763 units (up to 30/6/2009) which were covered under Schedule "1" and "2" of the amended Hazardous Waste (Management, Handling and Transboundary Movement) Rules, 2008. Jaipur has the highest number of potential hazard waste generating units (134), followed by Alwar (107), Udaipur (50), Bhilwara (33), Kota (30), and Jodhpur (28).

The state would carry out chemical risk-based micro zonation to prioritise the areas that require much attention.

Nuclear Hazard

The Rajasthan Atomic Power Station at Rawatbhata in Chittorgarh district near Kota has six units of Pressurized Heavy Water Reactors with a total capacity of 1,180 MW. Two more units of 700 MW are under construction. The construction and operation of these facilities are closely monitored and regulated by the Atomic Energy Regulatory Board (AERB). The plant is located in seismic zone II and is exposed to low level of risk from earthquakes. There is a proposal for constructing a new nuclear power plant at Banswara.

Risk due to nuclear / radiological emergency

Any radiation incident resulting in or having a potential to result in exposure and/or contamination of the workers or the public in excess of the respective permissible limits can lead to a nuclear/radiological emergency. After due consideration of the nature and consequences of all the possible scenarios, these radiological emergencies have been broadly classified into the following five categories:

1. An accident taking place in any nuclear facility of the nuclear fuel cycle including the nuclear reactor, or in a facility using radioactive sources, leading to a large-scale release of radioactivity in the environment.
2. A 'criticality' accident in a nuclear fuel cycle facility where an uncontrolled nuclear chain reaction takes place inadvertently, leading to bursts of neutrons and gamma radiations.
3. An accident during the transportation of radioactive material.
4. The malevolent use of radioactive material as a Radiological Dispersal Device by terrorists for dispersing radioactive material in the environment.

5. A large-scale nuclear disaster, resulting from a nuclear weapon attack (as had happened at Hiroshima and Nagasaki), which would lead to mass casualties and destruction of large areas and property. Normally, nuclear or radiological emergencies (referred to in points (1) to (4) above) are within the coping capability of the plant/facility authorities. A nuclear emergency that can arise in nuclear fuel cycle facilities, including nuclear reactors, and the radiological emergency due to malevolent acts of using Radiological Dispersal Devices are the two scenarios that are of major concern.[15]

The Impact of a nuclear disaster (scenario 5) is well beyond the coping capability of the state authorities and calls for handling at the national level.

From the recent events at the Fukushima Nuclear plant in Japan, it is important to review the onsite and offsite safety plans of Rawatbhata. In an incident on 2 February 1995, The Rajasthan Atomic Power Station leaked radioactive helium and heavy water into the Rana Pratap Sagar Reservoir, necessitating a two-year shut down for repairs.

Recognizing the enormity and crucial nature of nuclear and radiological disaster management, SEC would will identify and enlist officers with total responsibility of issues related to nuclear/radiological disaster management as a necessary first step towards ensuring effective implementation.

The collector of the district(s) where the nuclear power plant is located would be in-charge of the off-site emergency programme and he/she would not delegate his/her responsibility to anyone else at the lower level for handling any emergency.

Biological

Human Epidemics

Although, Rajasthan has a history of disease outbreaks such as Cholera, Gastroenteritis, Acute Diarrhoea/ Dysentery, Infective Hepatitis, Encephalitis, Poliomyelitis, Typhoid and recently H1NI; the State is particularly prone to Malaria. World Health Organisation (WHO) reports major incidents of Malaria in Districts of Barmer, Dungarpur, Ajmer, Bikaner ,and Jaisalmer in 1994, 1996, 2001, 2003, and 2006. In 2006, there were 99,529 recorded malarial cases, while in 2007 and 2008, there were more than 55,000 cases with 46 and 54 deaths respectively. The year, 2006 also recorded 26 deaths due to dengue fever. Additionally, 102 suspected Chikungunya fever cases were reported in 2006. This may be attributed to climatic conditions, and poor sanitary environment and hygiene practices. A report of ICMR (2009) also shows outbreak of Typhoid in Pali district due to faecal contamination in water.

SEC and DDMA would undertake activities related to vulnerability and risk analysis of various epidemics in the aftermath of natural disasters or biological threats associated with a particular region at each level. Based on this, the Integrated

[15] *2nd disaster management Congress, 2004*

Disease Surveillance Programme (IDSP) will be upgraded and strengthened. Facilities and amenities would be developed to cover all issues of environmental management like water supply, personal hygiene, and vector control, burial/disposal of the dead and the risk of occurrence of zootomic disorders.

Animal Epidemics

As per the livestock census of 2007, there are 578.99 lac animals and 50.11 lac poultry in the state. Rajasthan has about 7% of the country's cattle population and contributes 10% in milk production, 30% in meat, and 40% in wool production of the total production of the country. Out of total livestock in the country, 35% is in Rajasthan[16].

[16] *Disaster Management Plan for Livestock Epidemic, Department of Animal Husbandry, Government of Rajasthan*

Some of the common diseases in animals which can turn out to be an epidemic are as follows:

Table 3-2: Animal Epidemics in Rajasthan

No.	Disease	Affected animals
2	Black Quarter (BQ):	Cattle, particularly young animals are more severely affected
3	Foot and Mouth Disease (FMD)	Cattle, mostly cross bred
4	Sheep pox	Sheep and Goats
5	Enterotoxaemia (ET):	Sheep and Goats
6	CCPP	Sheep and Goats
7	Pestes des petits ruminants (PPR)-	Sheep and Goats
8	Bird flu	Poultry, Duck, Turkey and Water Fowl
9	Equine influenza	Equines
10	Swine Fever	Pigs
11	Swine Pasteuralosis	Pigs

Animal epidemics can lead to (1) escalated costs and losses to livestock producers, (2) reduced animal production, (3) reduction of foundation stock, (4) increase in livestock mortality rates, and (5) disruption of animal reproduction cycle (Delayed puberty, Anoestrus and Repeat breeding).

Epidemiological data and maps of endemic areas by disease diagnostic laboratories of the State show that the districts of Jaipur, Alwar, Bhilwara, Sawai Madhopur, Chittorgarh, Dholpur, and Dausa are endemic to Haemorrhagic Septicaemia; while the districts of Jaipur , Alwar, Sikar, Jhunjhunu, and Chittorgarh are endemic to Foot and Mouth disease.[17]

The various risks posed to livestock during natural disasters, i.e., spread of infectious diseases, fodder poisoning, Trans boundary animal diseases, various types of wars including conventional wars, biological warfare or biological terrorism will be analyzed to develop a comprehensive mitigation strategy. Relevant studies would be undertaken at each level by the Animal Husbandry department concerned.

[17] *Disaster Management Plan for Livestock Epidemic, Department of Animal Husbandry, Government of Rajasthan*

Terrorism

Rajasthan shares an international border of 1070 kms with Pakistan. The state is also in close proximity to New Delhi, which is the national capital. Moreover, many cities in the state are major tourist destinations. Hence, the possibility of the state being a soft target to terrorist attacks cannot be ruled out.

The bomb blast at the Ajmer Dargah on 11th October 2007 which killed two persons and injured 17 others and the Jaipur serial bomb blasts on 13th May 2008 that left 63 people dead and 216 injured are incident that show growing terrorism in the State.

Apart from the above mentioned, there are oil pipelines spread across the state, a nuclear power plant at Rawatbhata, important public offices in major cities, numerous tourist spots and religious places, a large presence of foreign tourists, and large sports events that can be soft targets for terrorist activities.

Crowd Management at Religious Places, Fairs (Mela), Exhibitions, and Special Events

There are many places of religious importance in Rajasthan where lakhs of people gather at a particular time of the year for a fair (mela). Some of these places witness large number of visitors all the year round. There is always a risk of stampede and chaos in such a large gathering if it is not managed properly. The stampede at the Chamunda Devi temple, Mehrangarh Fort at Jodhpur has brought back the focus on reviewing the management and security arrangements at such places. Government of Rajasthan have constituted the State Fair Authority to manage large gatherings like Dangals, Hela Khyals, local festivals, exhibitions, etc. Some of the places, which are particularly vulnerable to stampede and chaos are:

1) Khwaja Moinuddin Chisti Dargah, Ajmer
2) Salasar Hanuman Temple and Khatushyamji Temple, Sikar
3) Baba Ramdevera Temple, Pokhran
4) Lord Brahma Temple and Camel Fair ground, Pushkar
5) Shreenathji Temple, Nathdwara
6) Savaliyaji Temple, Chittor
7) Shiladevi Temple, Amer fort, Jaipur
8) Gadh Ganesh Temple, Jaipur
9) Sheetlamata temple, Charsu, Jaipur
10) Tripora Sundri Temple, Banswara.
11) Mehrangarh Fort at Jodhpur (during Navartri)
12) Kali Temple, Jodhpur
13) Geparnath temple, Kota

Mass Transport Accidents

A growing population is putting great stress on mass transport systems like the railways, air travel, and road transport. Increased traffic in all the three modes of transport have made them more prone to accidents.

Roadways

In cities, substantial increase in private vehicles and a lack of sense of safe driving leads to thousands of accidents every year. Jaipur, with a population of 35 lakhs has more than 9 lakh registered private vehicles.

From January 2009 to November 2010, there have been 47,555 road accidents, injuring 17,440 and killing 61,038 people in Rajasthan.

On Sept 21, 1993, 71 people died as the Kota-Bina passenger train collided with a goods train near Chhabra in Rajasthan.

Figure 3-3: Road Network

Railways

The upcoming Jaipur Metro Rail Project is planned to have two corridors across the city. Corridor-1 (North-South): This corridor, from Durgapura to Amba Bari, has a length of 17.352 km, out of which, 5.095 km is underground and the remaining 12.257 km is elevated, including the switch over ramp. A total of 18 number stations have been planned along this corridor out of which 13 are elevated and 5 are underground.

Figure 3-4: Railway Network

Corridor-2 ((East - West): This corridor from Mansarovar to Badi Chaupar, has length of 11.566 km. A total of 11 stations have been planned along this corridor out of which 8 are elevated and 3 are underground[18]. The scale of infrastructure associated with this project, makes it imperative for the state to take cognizance of potential risks posed by natural and manmade hazards such as earthquake, flood, fire, and terrorism.

Approximately 580 km of rail corridor along with Delhi Mumbai Industrial Corridor (DMIC) passes through Rajasthan. This project is likely to increase rail traffic substantially in the state, which could lead to greater risk for communities and livestock living in the vicinity of the rail corridor.

[18] *www.jaipurmetrorail.in*

Airways

With increasing, domestic and international air connectivity to Jaipur and other airports of Rajasthan (Jodhpur, Udaipur), the State can also be exposed to the threat of aviation disasters. However, till date no such occurrence or crisis situations have been faced by any of the airports in the state.

Mining and Other Industrial Hazards

Mining is one of the most important industries employing thousands of people across the State. The safety and environmental norms are being largely adhered to. However, the possibilities of risk of lives of thousands of workers at the mines and the communities living in their vicinity cannot be ignored. Being largely operated by unorganised sector units, the compliance with labour laws and various safety procedures need to be strengthened. Also, the effective coordination amongst the Departments of Industries and Mines and the labour law enforcing agencies has been prioritised to reduce risk in the state.

Other risk enhancing factors/ perpetuating factors

Extreme Climate and Climate Change

Rajasthan is characterized by high climate sensitivity due to impacts on various climate sensitive sectors like agriculture, water resources, forests, bio diversity and human health. These sectors already face challenges due to pressures from a growing population, rapid economic growth and the degradation of environment and natural resources, which are likely to exacerbate under conditions of climate change.

The study by TERI (2008)[19] reveals that some of the environmental and ecological effects of climate change are evident in this region. Gidhh or vultures, which were found in abundance in Jhalawar and other areas of Thar region, have been pushed to near extinction. Similarly, grasses like Dhaman, and plants like Fog and Rohidda have diminished to a significant extent in some areas. The traditional wisdom and age-old indicators for seasonal prediction have become obsolete under current changes in climate. Poor farmers have lost all their investments due to the unpredictability of weather. Small and marginal farmers suffer the most due to climate change manifesting through rising temperature and erratic rainfall, reducing the scope for livelihood through agriculture and animal husbandry.

Rajasthan Action Plan on climate change (RAPCC 2011 Draft) identifies vulnerability and challenges posed due to climate change as follows:

Observation records for over 100 years indicate that the probability of occurrence of severe and very severe droughts is high over the western Rajasthan region. Changes in duration of seasons (longer summers and shorter winters) are adversely affecting growing seasons of rabi and kharif. Increases in March temperatures are adversely affecting the sowing and production of wheat. It will lead to decrease in productivity of crops and livestock and decline in pastureland. Climate projections indicate

[19] *The Energy Research Institute*

decrease in rainfall in the future, which will further limit the recharge of groundwater resources that are already overexploited. It will also lead to acute water stress conditions for River Luni in western Rajasthan.

Exploitation of forests coupled with occurrence of dry climatic conditions can create favourable conditions for the outbreak of forest fires, destroying the carbon sinks and releasing large amount of Greenhouse Gases (GHGs). Climate change induced shifts in forest types can endanger livelihoods of forest dependent communities, species habitats, and biodiversity.

Climate change may lead to increased mortality and morbidity associated with increased risk of exposure to vector borne, water borne and food borne diseases. Changes in agricultural production can affect nutrition related health deficiencies. Increases in temperatures can result in higher incidences of heat stress related morbidity and mortality in the state.

Thus, changes in climatic variables and occurrence of extreme events will pose an additional stress on the current pressures. They are likely to adversely affect future trends of socio-economic development and the state of environment and natural resources.

Degradation of Traditional Water Harvesting Structures

Over time, the traditional water harvesting systems of Rajasthan such as Para, Beri, Kui, Johad, Nadi, Toba, Jhalara, Tanka etc. have degraded due to a lack of maintenance and diminishing knowledge and skills to construct them. Also, as water supply is considered the function of the government, these indigenous community driven practices have suffered seriously. These traditional practices were the main coping mechanisms for the community against water scarcity and drought. Some of these systems were crucial for ground water recharge and the sustenance of ecological balance in the region.

Urbanisation, Water Sanitation and Environment Health

The State is witnessing a rapid increase of urbanization giving rise to concerns like slums and squatter settlements, pollution, unregulated expansion of urban areas, transportation problems, etc. Excessive urbanisation has contributed to the occurrence of major disasters, both natural and man-made. Even natural disasters have different ramifications when they occur in urban areas due to the high population density.

With increasing migration from rural areas, the cities and towns of Rajasthan face huge challenges in terms of shelter, water, sanitation and environment health services. The Human Development Report 2007 has taken serious note of growing shanties in cities and the dismal performance of water supply, sewerage and environment health services like solid waste management and waste water treatment. Another aspect of vulnerability in urban areas (like parts of Jaisalmer, Jodhpur, Udaipur and Jaipur) are compact habitations, forts, and old stone constructions, which are vulnerable to earthquakes.

Water remains the most precious resource for most parts of Rajasthan. Poor communities have inadequate access to clean water for drinking and cooking. This results in poor personal hygiene conditions. Families have to spend a large chunk of their income on transporting safe water.

District wise HVR Analysis

Figure 3-5: Multi- Hazard Profile of State;

District wise Hazard Profiling

Table 3-3: District-wise hazard profile

Name of district	Wind	Flood	Drought	Earthquake	Industrial Accident
Bikaner	Moderate	Low	High	Moderate	Moderate

Name of district	Wind	Flood	Drought	Earthquake	Industrial Accident
Churu	Moderate	Low	High	Low	High
Ganganagar	Moderate	Moderate	High	Low	Low
Hanumangargh	Moderate	Low	High	Low	Low
Jodhpur	Moderate	Moderate	High	Low	High
Barmer	Moderate	Moderate	High	High	High
Jaisalmer	Moderate	Low	High	Moderate	Moderate
Jalore	Moderate	Moderate	High	High	Moderate
Pali	Moderate	Moderate	Moderate	Low	Moderate
Sirohi	Moderate	Moderate	High	Moderate	Moderate
Ajmer	Moderate	Moderate	High	Low	Moderate
Bhilwara	Moderate	Low	Moderate	Low	Low
Nagaur	Moderate	Moderate	High	Low	Moderate
Tonk	Moderate	Low	Moderate	Low	Low
Bharatpur	Moderate	Moderate	Low	Moderate	Moderate
Dholpur	Moderate	Low	Low	Low	Low
Karauli	Moderate	Low	Moderate	Low	Low
S. Madhopur	Moderate	Low	Moderate	Low	Moderate
Jaipur	Moderate	Moderate	Moderate	Moderate	High
Alwar	Moderate	Moderate	Moderate	High	**High**
Dausa	Moderate	Low	Moderate	Low	Moderate
Jhunjhunu	Moderate	Low	Moderate	Moderate	Moderate

Name of district	Wind	Flood	Drought	Earthquake	Industrial Accident
Sikar	Moderate	Low	Moderate	Low	High
Kota,	Moderate	Moderate	Moderate	Low	High
Baran	Moderate	Moderate	Moderate	Low	Low
Bundi	Moderate	Moderate	High	Low	Low
Jhalawar	Moderate	Moderate	Moderate	Low	Low
Udaipur	Low	Moderate	Moderate	Low	Moderate
Banswara	Low	Low	Moderate	Low	Low
Chittorgargh	Moderate	Moderate	Moderate	Low	Low
Dungarpur	Moderate	Low	High	Low	Low
Pratapgargh	Moderate	Low	Moderate	Low	Low
Rajsamand	Moderate	Low	Moderate	Low	Low

This inference is evolved from analysis of various disaster hazard maps in BMTPC and secondary information.

Chapter 4 - Prevention & Mitigation

Rajasthan broadly faces droughts, floods, earthquake in natural disaster, while in manmade disaster are terror attacks, accidents, and fire. Along with this the state is also vulnerable to nuclear and industrial disasters. According to United Nations International Strategy for Disaster Reduction "prevention" expresses the concept and intention to completely avoid potential adverse impacts through action taken in advance. Unlike man-made disasters, natural hazards like floods, earthquakes, and cyclones cannot be avoided. However, with proper planning of developmental work in risk prone areas, these hazards can be prevented from turning into disasters. "Mitigation" is referred as the task of minimizing the loss through structural and non structural measures.

To effectively handle the above mentioned natural and man-made disasters the strategy should encompass prevention and mitigation aspects in an integrated manner that would involve having an effective early warning system and involvement of nodal departments as well for the different types of disasters the state is vulnerable, as shown in the schematic diagram below:

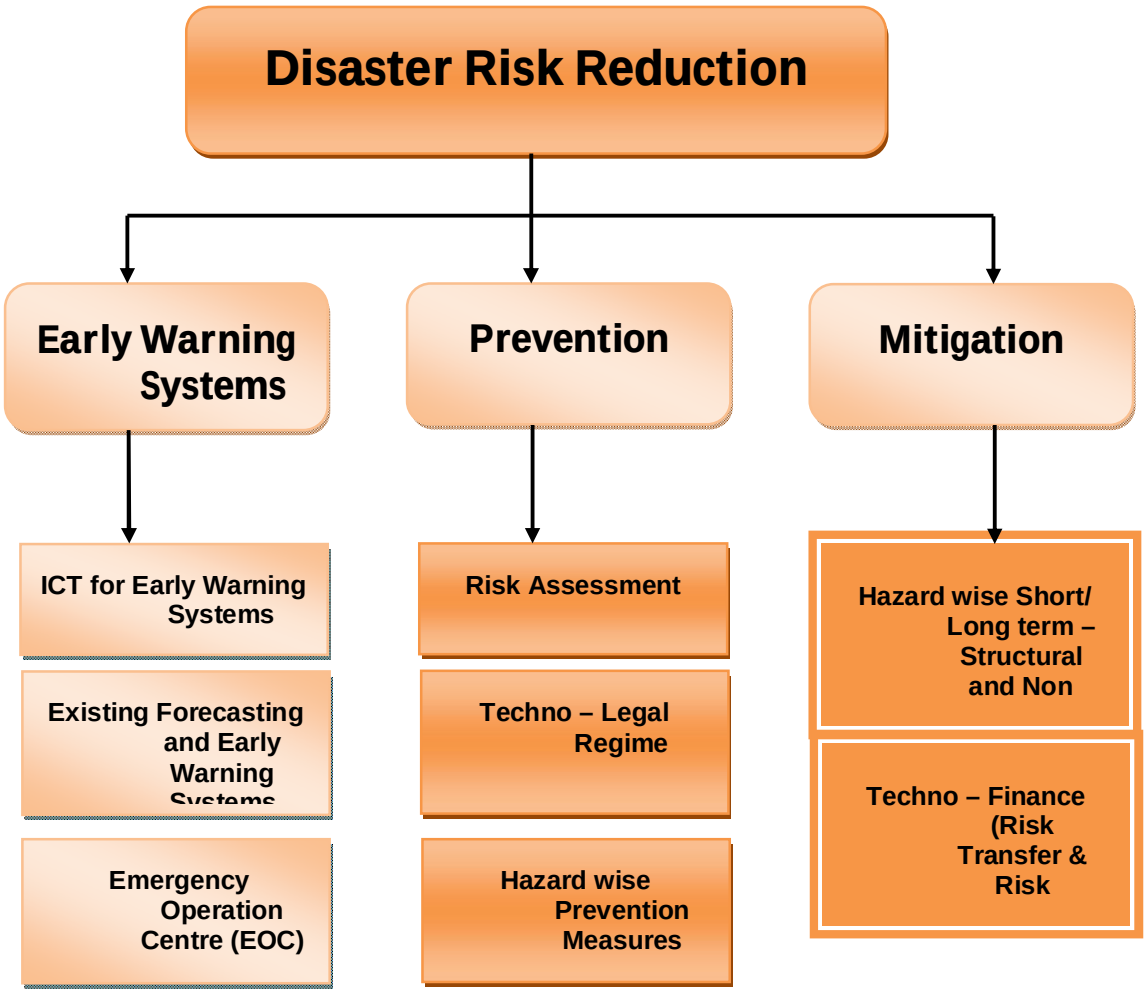

Figure 4-1: Schematic representation of DRR in prevention and mitigation

Prevention

Prevention involves identification and determination of the levels of risk associated with hazards and taking action to reduce potential loss or damage to life, property, and the environment. It can be done through legislation and its enforcement, e.g., land use codes, safety regulations, building codes, hygiene, disease control, flood management etc. Other measures of prevention may include conservation of natural resources, watershed management, strengthening of public infrastructure and developing a foolproof communication network. Ecological restoration, environment management and capacity building exercises also play an important role in prevention and mitigation of a potential hazard. Lack of appropriate prevention measures can make disaster situations more complex and difficult to handle.

The Disaster Management and Relief Department is a member of all the regulatory bodies in the State in order to ensure that measures required for safe planning are enforced. The existing Town and Country Planning Act, Industrial Master Plan and Land use Zoning Norms would be evaluated to make necessary amendments to ensure that implementation of these Acts and Rules do not increase our vulnerability.

Risk assessment

The first step towards disaster risk reduction is identification of hazards and assessing the potential risks from these hazards. Risk assessment is a methodology to determine the nature and extent of risk by analysing potential hazards and evaluating existing conditions of vulnerability that together could potentially harm exposed people, property, services, livelihoods, and the environment on which they depend.

As a first step towards addressing disaster vulnerabilities, all departments, agencies, knowledge-based institutions and DM authorities at the State and District levels need to carry out risk and vulnerability assessments of all disaster prone areas. Hazard zonation mapping and vulnerability analysis based on GIS and remote sensing data, need to mandatorily include a ground check component. Hazard and Consequence Mapping on GIS platforms will be prepared for all chemical accident prone districts.

Techno legal regime

It is essential to have a conducive techno-legal regime to limit the ill effects of disasters by formulating effective policies, guidelines and bye laws and their strict enforcement by relevant state departments, local bodies, agencies, and private establishments. The DM Act, 2005, lays down the institutional and coordination mechanisms at the national, state, district, and local levels. Effective prevention and mitigation measures need a comprehensive techno legal regime encompassing the following measures:

Revision of Municipal Regulations

In view of the construction boom and rapid urbanisation, municipal regulations such as development control regulations, building bye-laws and structural safety features need to be revisited. SEC would review these regulations periodically to identify safety gaps from earthquake, flood, and other disasters and modify them suitably to align to revised building codes of the Bureau of Indian Standards (BIS). Undesirable practices compromising safety during disasters would be addressed in the regulations. The utilisation of unsuitable areas for construction, without necessary safeguards further enhances vulnerability and needs to be guarded against through appropriate compliance mechanisms. Similarly, suitable regulations would be introduced for rural areas.

Land Use Planning

SEC, in consultation with scientific institutions, would carry out analysis of environmental and hazard data for formulation of alternative land use plans for different geographical and administrative areas with a holistic approach. This is more relevant to big cities and high-density urban settlements for safer location of habitat and other critical facilities. A review of master plans and their compliance, on priority, will be essential and is regarded as the paramount responsibility of the State. At the macro-level, there is a need for preparation of land use planning based on the inventory database of various uses. The future land use in urban settlements is to be assessed keeping in view the anticipated intensity of development.

Safe Construction Practices

Hazards like earthquakes do not kill people but inadequately designed and badly constructed buildings do. Ensuring safe construction of new buildings and retrofitting of lifeline buildings shall be taken up as a priority. The design and specification of houses being constructed under the Indira Awas Yojana (IAY) and other government welfare and development schemes will also be re-examined to ensure hazard safety. Observance of the National Building Code shall be made mandatory in all the State/ Municipal building bye-laws. Training of engineers, architects, small builders, construction managers and artisans needs to be intensified at the state and district levels. Safe schools and hospitals (with large capacity) and important Monuments besides other critical lifeline buildings shall be regarded as a State priority. Enabling provisions shall be made in all State designed school buildings/ hostels with earthquake resilient features and to equip them with appropriate fire safety measures.

Compliance Regime

There is a need for putting in place a sound compliance regime, with binding consequences, to ensure the effectiveness of the techno-legal and techno-financial provisions. It is important to ensure that monitoring, verification and compliance arrangements are in place at the State level. It will be the responsibility of all stakeholders concerned to implement these provisions.

The state government/SDMA would adopt a model techno-legal framework for ensuring compliance to earthquake-resistant design and construction practices in all new constructions. The State government would update the urban regulations by amending them to incorporate multi-hazard safety requirements. The State government would review, revise and update the town and country planning Acts, land use and zoning regulations, building bye-laws and DCRs, and this process will be repeated at least once every five years. The State Commission on Urbanization would lead the process.

Hazard wise prevention measures

Table 4-1: Hazard wise Preventive measures for all departments and agencies

SN	Hazard	General Measures	Techno legal provisions
1	Drought	• Some of the strategies for prevention of drought are • Conjunctive use of surface and ground water • Watershed development • Integrated basin planning • Strategy based on Agro-Climatic Regional Planning • Water Management in Irrigated Agriculture • Adopting appropriate cropping pattern • Containing ground water exploitation • Rainwater harvesting and Artificial recharge of ground water • Renovation of Tanks and Tankas • Proper Maintenance of Irrigation systems • Deficit Irrigation • Sprinkler and drip irrigation	• Setting up real time dynamic database for water resource and development of water resource information system (WRIS) • Conducting a detailed water resource inventory, including annual variations at micro watershed level • Expanding current network of automatic weather stations and rain gauge stations for much more granular records of evaporation and rainfall data • DMCs will harmonize the current/ ongoing efforts by various knowledge centres at the national and international levels. • Convergence with State Water Policy 2010

		• Reuse of irrigation water • Use of water of suboptimal quality • Prevention of evaporation losses from reservoirs • Reduction in conveyance losses • Reduction in evaporation from soil surface	
2	Earthquake	• Awareness of general public and wide dissemination of do's and don'ts through electronic and print media • Awareness generation of basic retrofitting measures • Capacity building of engineers, architects and masons through trainings	• The Hazard Safety Cell (HSC) has been established under Chairmanship of Secretary, Disaster Management and Relief Department. • A retrofitting clinic has been set up at MBM Engineering College, Jodhpur. The clinic imparts trainings to engineers, architects and others for retrofitting measures. • State resource institutes (SRIs) have been identified to function as institutes for capacity building, trainings, and research and development • SEC shall establish the necessary techno-legal and techno-financial mechanisms to ensure that all stakeholders like builders, architects, engineers and government departments, responsible for regulation and enforcement adopt earthquake-safe construction practices and provide for seismic safety in all

			design and construction activities. • State government shall review and adopt the Model Town Planning Bye-Laws prescribed by MHA. • All professionals dealing with safety aspects of buildings and structures will be certified through a licensing process. Such certification requirements, in accordance with the criteria evolved by the model techno-legal regime, will be incorporated in the DCRs. • SEC would establish a techno-legal framework for the certification of artisans involved in the construction industry. • The major projects and critical structures would be put through a mandatory compliance review by qualified external agencies. • All modifications to existing buildings, including seismic strengthening and retrofitting projects would be regulated and monitored by the ULBs. • State would take appropriate measures in construction of buildings by involving PRIs in rural areas as per the earthquake manual.
3	Flood	• Sound watershed management through extensive soil conservation,	• An appropriate legal framework would be developed by SEC to obtain clearance

		catchment area treatment, preservation of forests and increasing the forest area and construction of check dams would be promoted to reduce the intensity of floods[20]. • Adequate flood cushion would be provided in water storage projects wherever feasible to facilitate better flood manage3.ment. • An extensive network for flood forecasting would be established for timely warning to the settlements in the flood plains, along with the introduction of regulation for settlements and economic activity in the flood-prone zones to minimise loss of life and property caused by floods.	for the plans for construction of infrastructure in flood prone areas • SEC would ensure incorporation of provisions of the Flood Manual for adherence of building bye-laws for buildings in flood prone areas. • Unplanned growth would be restricted by SEC so that the construction of structures obstructing natural drainage or resulting in increased flood hazard is not allowed. Safety of important installations and buildings shall be prioritised. • Conducting research studies on water flows, carrying capacity of canals, water balance etc. related to impacts of climate change on water resources • A platform to share real-time information on flood situation amongst various departments and authorities (like dam authority, power plants, ULBs, irrigation dept., agriculture dept, DM and R)
4	Hail storm	• Dopplers are installed to monitor and forecast for extreme weather events including hailstorms.	• Installation of Doppler radar has been completed by the IMD in Jaipur.

[20] *www.waterresources.rajasthan.gov.in/disasters.htm*

		• Early warning dissemination	
5	Heat and cold waves	• State ensures establishing night Shelters in all urban and peri urban areas and rural areas, if required. • Distribution of blankets, bamboo sheets, tarpaulin, clothing and other items would be considered by the concerned authorities with support from NGOs and other community groups.	
6	Epidemic	• Targeted vaccination drives • Community partnership in early warning and surveillance • Procurement of equipment for critical care • Establishment of new laboratories and upgradation of existing laboratories • Awareness generation on safe sanitation and hygiene promotion, household water treatment methods, use of ORS and other commonly used preventive medicines • Fogging and spraying of insecticides	• Integrated surveillance system for monitoring chronic areas and developing IT enabled decision support systems • Developing a platform to share real time information amongst various departments and authorities during epidemics • Regulation on handling of toxic material like insecticides commonly used for fogging, spraying

		as a preventive measure against vector borne diseases	
7	Oil Fire	• Working out various standard procedures for self risk assessment of fire safety for industries, educational institutions, health institutions, public places, and government buildings	• Developing buffer zones surrounding high risk installations • Restricted development in the vicinity of oil depots and hazardous chemical industries • Developing green belts surrounding hazardous industries to offset any adverse impact on environment • Strict enforcement and adherence to onsite and offsite disaster management plans for oil depots and industries
8	Forest fires	• Microzonation of high risk areas within forests • Use of remote sensing technology for monitoring forest fires • Building capacity for remote sensing application for early warning of wild fires • Signage for high risk areas	

9	Terrorism	• Awareness generation through electronic and print media • Installation of CCTV and access control systems for all public places, institutions and major hotels • Increased safety of public transport systems and tourist destinations by infrastructure development for restricted entry. Construction of barriers for restricted entry and anti trespassing arrangements for all public placesStrengthening intelligence gathering and analysis systemsUse of latest information technologies for establishing integrated systems for intelligence analysis from the data provided by various agencies • Use of electronic and print media, telecommunication technologies, information technologies, social network site • High level security at key installations.	• National Intelligence Agency (NIA) has been set up to work as a common agency to analyze intelligence inputs from various state and national agencies. SEC will receive regular actionable intelligence inputs from NIA and other state level intelligence agencies to determine actions pertaining to disaster management. • Strengthening legislations to counter and thwart any impending or imminent terrorist activities such as no negotiation policy for hijackings and strict anti terrorism laws etc.
10	Nuclear and radioactive	• Incentive and penalty schemes to promote a safe working	• The Atomic Energy Act, 1962 is the main Nuclear Legislation in India. The Atomic Energy Regulation Board (AERB)

	hazards	environment • Policy for mandatory DRR plans for industries • Robust early warning, leakage detection, fire alarms • Adequate infrastructure development (e.g. Roads for evacuation, etc) would be given due attention. • Effective coordination amongst the nearby districts would be strengthened. • Use of electronic and print media, telecommunication technologies, information technologies, social network sites • Risk reduction calls for the implementation of transparent, comprehensive, efficient and effective risk management strategies to take care of, inter alia, the health and environmental effects along with social and economic factors.	regulates the safety provisions envisaged in the Atomic Energy Act to ensure that the use of ionising radiations and nuclear energy does not cause undue risk to public health and the environment.

Mitigation

Mitigation measures can be divided in two categories:

1. Structural measures: on site works, construction, and engineering works, and
2. Non-structural measures: which include studies, research, regulations, policy changes and capacity building activities that support the structural measures.

These categories can be further classified into:

Long term and Short term measures.

Table 4-2 enlists the activities to be taken up in the short term and long term by each department working as the nodal agency for a particular hazard. Departments would draw up their own plans, goals and milestones and review them annually for achievements and for planning the next year.

SEC will give due weight age to indigenous knowledge on disaster and coping mechanisms adopted. Special focus will be made for protection of heritage structures.

Table 4-2: Hazard-wise mitigation measures for departments and agencies

Disasters/ Departments	Short Term		Long term	
	Structural measures	**Non structural measures**	**Structural measures**	**Non structural measures**
Drought (Relevant Agencies: DM&R, Department of Water resources and	• Rain water harvesting structures • Soil and moisture conservation measures • Developing fodder plots	• Collaboration with international research institutes to develop and adopt resource efficient dry land techniques • Training on watershed and water	• Massive drive to develop and conserve local water resources • Identify sites for irrigation tanks and construction of small irrigation	• Leveraging MGNREGS for drought proofing programmes • Planning and implementation of integrated watershed management (IWMP) Participatory

irrigation, Department of Agriculture and Department of Animal Husbandry)	• Promotion of dry land agriculture practices such as low tillage, in situ soil moisture conservation, raised bed, ridge furrow, mulching etc. • Convergence of MGNREGS and other state schemes to augment local water resources	harvesting techniques • Community Fodder banks • Salt resistant crops • Promoting low water consumption technologies such as drip and sprinkler irrigation etc.	schemes • Long term irrigation projects • Leveraging MGNREGS and state specific schemes to improve efficiency and working of the Indira Gandhi Canal Project.	Irrigation programmes
Earthquake (Relevant agencies: UDH and PWD)	• Phased and prioritized retrofitting of all unsafe buildings in major cities vulnerable to earthquake. • Revision of General Development Control Regulation (GDCR) to regulate construction and land use planning	• Orientation of PWD and UDH staff for earthquake safety and their role in disaster management • Safety audits in major cities vulnerable to earthquakes • Capacity building of architects, engineers and masons on earthquake resistant features	• Retrofitting of unsafe buildings in all cities, towns and villages • Strict enforcement of Byelaws pertaining to seismic safety for all structures • Notification of risk prone areas by seismic microzonation	• Safety audit in all cities, towns and villages • Mock-drills for Schools, Hospitals, Public Buildings • Intensive trainings and orientation on earthquake resistant construction to private and government engineers, architects • Notices to all private buildings not complying to safety

				norms and that are structurally unsafe
Flood (Relevant agencies : Water Resources and Irrigation Department)	• Removing encroachment on natural drainage paths • Construction of embankments/levees • Channel improvement/alterations • Drainage improvement in urban areas • Storm water management • Construction of safe shelters • Watershed management	• Carrying out micro planning for structural measures in all districts • Linkages with JNNURM and MGNREGA and state specific schemes for taking up construction works for flood mitigation in cities and villages	• Enforcement of bylaws to avoid structural development in low lying areas. • Construction of spread channels and embankments to prevent flooding in inhabited regions. • Detailed drainage studies: The state government /SDMA would review the adequacy of existing sluices and drainage channels in areas suffering from drainage congestion. If the capacities of existing sluices in embankments and drainage	• Strengthening enforcement of Building safety regulations • Awareness and wider dissemination of Flood zone management plans • Restricted development in high risk zones • Promoting relevant insurance schemes for human lives, livestock, and properties

			channels are inadequate, they would be improved by increasing the vents and improving outfall conditions. • State government /SDMA would prohibit blocking natural drainage channels and sluices by an appropriate law and improve their capacity and construct new channels and sluices to ensure flow of excess rainwater from the area. • Flood proofing: The state government/	

			SDMA would take steps to make all public utility installations flood safe. • Removing encroachment on natural drainage paths. • The SEC would take up appropriate watershed management measures including afforestation, check dams, detention basins etc. in the catchment of rivers to prevent soil erosion, enhance water conservation and minimize water and sediment runoff.	
Hailstorm/ Frost		• Promoting Insurance	•	• Strengthening of Early

(Relevant Agencies: DM and R, Agriculture Department)		and relief packages		warning mechanism
Urban Fire (Relevant Agencies: UDH, civil defence, local self government)	• Strict adherence to fire safety standards in urban areas, especially in high-rises • Assessment of tools, equipment and plants needed for fire safety, their procurement and positioning	• Increasing awareness on the Do's and Don'ts to prevent fire accidents • Professional and intensive trainings for fire fighters • Fire fighting drills involving communities • Regular maintenance or replacement of old equipments, • Inspection procedures and schedules of inspection of fire fighting systems at vital installations and important public buildings	• Modernization of fire fighting forces, equipments.	• Need based and result based planning and management (including human resources and equipments) • Collaboration with national and international agencies for training and capacity building of fire fighters • Mock drills and trainings in schools, hospitals, high rises, and institutions
Rural & Forest Fires	• Demarcation of hazard prone	• Awareness campaigns		

(Relevant Agency: Forest Department)	areas • Putting up signage for high risk areas			
Biological Disaster Relevant Agencies: Health, Water Resources Department	• Basic infrastructure development in all major cities and towns for Mass Casualty Management (MCM)	• Creating a database for endemic areas/ populations • Concentrated projects in endemic areas • Training of government and private hospitals for MCM	• Modernization and development of Health Infrastructure development under schemes of RHSDP, NRHM • Strengthening logistics and distribution networks for drugs	• Village level plans for health, water and sanitation under NRHM • Capacity building for Mass Casualty Management • Strengthening surveillance system for chronic and endemic diseases • Identification and mapping of endemic areas
Industrial and Chemical (including oil fires) (Relevant Agencies: Factories and boilers Department,	• Onsite and offsite infrastructure development for safety and security of workers and other vulnerable populations	• A dynamic safety plan for all hazardous industries, including training and capacity building for all workers • Awareness of general public, living in the vicinity of hazardous industrial units	• Infrastructure development for hazardous material handling and fire safety in large industrial units	• Strengthening surveillance, monitoring, and enforcement processes for hazardous waste generating units, mining, and petroleum industries. • Strengthening environment impact

Industries and Petroleum Department, Home Department)		• Plan for safe disposal of all hazardous waste • Regular inspection, simulations, mock drills for safety • Capacity building for hazardous material handling		assessment procedures
Terrorism (Relevant Agency: Home)		• Mandatory mock drills for all large private and public buildings • Strengthening identification and registration processes in all hotels, guest houses • Engagement of private security agencies in surveillance and security of private buildings • Training for private security agencies		• Integrated Intelligence data inputs, analysis and decision making systems • Developing ICS/IRS for Coordinated effort of all security forces and other agencies • Developing dedicated force for counter terrorism like Force One in Maharashtra
Nuclear (Relevant Agency: Home)	• Inbuilt safety measures, including	• On site and off site plans for disaster response	• Safety audits, adherence to a safety culture	• Capacity building of the doctors on

	biological shields, safety systems and interlocks		combined with operational and administrative safety procedures to prevent the chances of radiation accidents in facilities. • Development and creation of infrastructure (e.g. Road for evacuation).	decontaminatio n process. • Awareness creation amongst the communities for taking appropriate actions for evading contamination.

Climate change mitigation

As described in the previous chapter, climate change and its effect on environment, ecology, natural resources, and livelihoods of people is emerging as a complex challenge for the coming years. The Draft Rajasthan Climate Change Action Plan (RCCAP) envisages adverse impact of climate change in four broad sectors: I) water resources, ii) Agriculture and Animal Husbandry, iii) Forests and Bio diversity, and IV) Health. The plan gives broad strategies and enlists short term and long term measures for mitigation of climate change impacts on all the four sectors and also outlines other measures to counter climate change such as enhanced energy efficiency, building sustainable habitats and increasing strategic knowledge of climate change.

The strategic approaches as suggested in the plan are given below in table 4-3.

Table 4-3: Climate change mitigation strategies

Sectors	Strategies
Water resources	• Developing a comprehensive database for assessment of impacts of climate change on water resources • Ground water management with focus on over exploited areas • Development of drought monitoring and early warning systems • Water Conservation and demand management in urban and rural systems • Improving water use efficiency
Agriculture and Animal Husbandry	• Development of climate hardy cultivars and livestock • Development of pasturelands and wastelands and restoration of grazing lands • Creation of database for climate risk management • Enhancing productivity of dry lands • Management of multifunctional agro forestry systems
Forestry and Biodiversity	• Afforestation/ reforestation for maximizing the mitigation potential of forests • Monitoring likely shifts in forest types, species, especially in desert ecosystems and sand dunes • Integrating traditional knowledge in adaptation techniques
Health	• Enhancing disease monitoring and surveillance systems • Health impact assessments for vulnerable populations

	• Greater inter-sectoral convergence to enhance primary, secondary and tertiary health care
Energy Efficiency	• Inventorisation and management of Greenhouse gases (GHG) • Harnessing the full renewable energy potential in the state • Focusing on energy efficiency
Sustainable habitats	• **Integrating land use and transportation planning** • **Green building legislation** • **Reducing GHG from transport sector** • **Urban waste management**

Risk Transfer (or Risk Distribution)

Considering that the assistance provided by the Government for rescue, relief, rehabilitation and reconstruction needs cannot compensate for massive losses on account of disasters, new financial tools such as catastrophe risk financing, risk insurance, catastrophe bonds, micro-finance and insurance etc., will be promoted with innovative fiscal incentives to cover such losses of individuals, communities and the corporate sector. In this regard, the Environmental Relief Fund under the Public Liability Insurance Act, 1991, enacted for providing relief to chemical accident victims is worth mentioning. Some financial practices such as disaster risk insurance, micro-finance and micro-insurance, warranty on newly constructed houses and structures, and linking safe construction with home loans would be considered for adoption.

Crop Insurance

The State Government shall promote agricultural insurance programmes suitable for different agro-climatic zones, and ensure that farmers are informed about the availability of insurance products and educate them about the need for managing their yield and income risks through insurance coverage. Weather insurance would be promoted for crops not having database on productivity. The state would work with the central government to widen the scope of the National Agricultural Insurance Scheme (NAIS) to include pre-sowing and post harvest losses. Awareness will be enhanced with reference to crop insurance through state departments to improve coverage. Price fluctuations will be stabilized by strengthening links of farm products with agro-based industries. Price linked insurance products will be promoted to avoid distress sales of farm produce.

The use of satellite derived crop condition images as surrogates to crop yield estimates will be explored to facilitate the settlement of insurance claims.

Flood Insurance

The Department of Water Resources and Irrigation (DOWR & I) and insurance companies would jointly take up studies for a graded system of insurance premium according to the

flood risk in flood prone areas of the state. The DOWR & I would explore the possibility of introducing schemes where insurance of structures, buildings and crops in flood plains is made compulsory.

Chapter 5 - Mainstreaming DRR Concerns in Development Planning

"Mainstreaming" DRR into development means "to consider and address risks emanating from natural hazards in medium-term strategic frameworks and institutional structures, in country and state strategies and policies and in the design of individual projects in hazard-prone regions."[21]

Government of India has adopted a holistic approach for ensuring sustainable development of the nation and a number of social development policies have been formulated and programmes are being implemented to address the vulnerable groups in the society.

Some of the major development programmes are as follows:

-NREGS (Mahatma Gandhi National Rural Employment Guarantee Schemes)

-JNNURM (Jawaharlal Nehru Urban Renewal Mission)

-National Rural Health Mission

- Swarna Jayanti Shahari Rojgar Yojana

- National Social Assistance Programme which includes (Indira Gandhi National Old Age Pension Scheme, Indira Gandhi National Widow Pension Scheme, Indira Gandhi National Disability Pension Scheme, National Family Benefit Scheme)

- Indira Awas Yojana

- Rajiv Awas Yojana

Successful implementation of these schemes will essentially reduce the vulnerability of the targeted

Correlating MDGs and Government Schemes

MDG 1: Eradicating extreme poverty & hunger

Example: Public Distribution System (PDS), Mahatma Gandhi National Rural Employment Scheme (MGNREGS), Watershed Programmes

MDG 2: Achieving Universal primary education

Example: Sarva Siksha Abhiyan (SSA)

MDG 3: Promoting gender equality & empowering women

Example: Reservation in institutions from PRIs to Parliament, Domestic Violence Bill, SABLA, Indira Gandhi Mahila Swasthya Yojana (IGMSY)

MDG 4: Reducing child mortality

Example: Integrated Child Development Services (ICDS), National Rural Health Mission (NRHM), Jawahar Swaraj Yojana (JSY)

MDG 5: Improving maternal health

Example: National Rural Health Mission (NRHM), JSY, SABLA, IGMSY, State specific reproductive and child health schemes

MDG 6: Combating HIV AIDS/Malaria & other diseases

Example: National Aids Control Organisation and NRHM

MDG 7: Ensuring environmental sustainability

Example: National Climate Change Agenda, Clean Development Mechanism, various programmes by MoEF, State Forest department, promoting alternate energy

MDG 8: Developing a global partnership for development

Example: CDM, Biotechnology Mission

[21] *Provention, 2007*

population towards disasters as well[22]. In other words, there is a link between Disasters and Development that needs to be looked critically. The box above shows how Millennium Development Goals (MDGs) are addressed in national and at the state level. These programmes inherently address to some of the issues of disaster risk reduction (DRR) and thereby reduce disaster vulnerability.

Disaster Risk Reduction has a twofold aim:

1. "Addressing vulnerability in order to be resilient to natural hazards" and,
2. "Ensuring that development efforts do not increase vulnerability to these hazards." Reducing disaster risks is more affordable than repairing damage or totally replacing damaged structures.

The following schematic diagram explains how mainstreaming of DRR into development planning could be undertaken at various levels:

[22] *National Progress Report on the Implementation of the Hyogo Framework for Action (2009-2011)-Interim, Disaster Management Division, Ministry of Home Affairs*

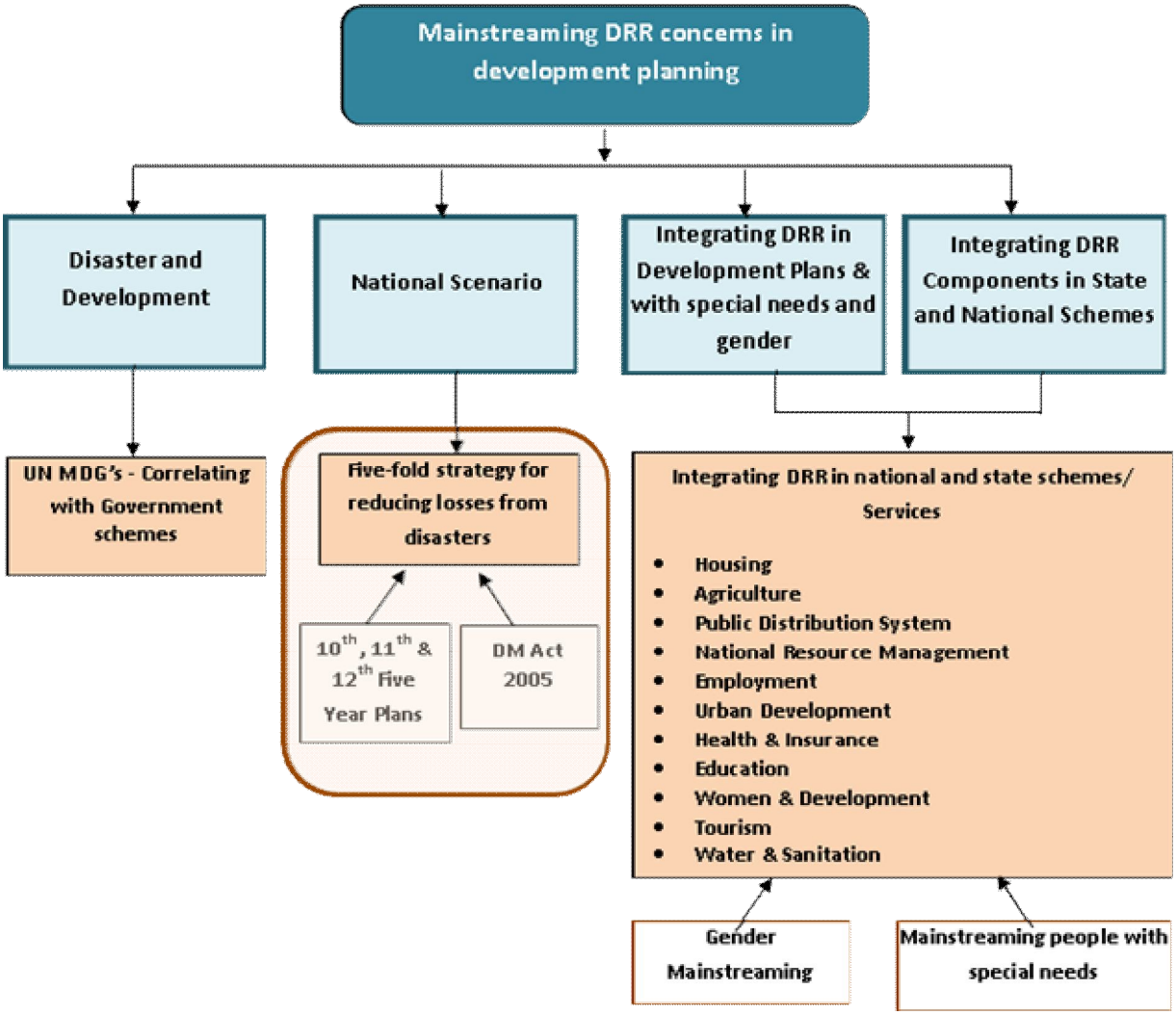

Figure 5-1: Mainstreaming DRR in development plan

It is to be noted that the lack of disaster risk considerations in the development processes, including rehabilitation efforts following major catastrophes, leads to investments in "constructing and reconstructing risks" which perpetuate the conditions for unsustainable human development. As a result, the achievement of poverty alleviation, good governance, and other related goals becomes more difficult.[23]

National scenario

The UN Millennium Report recommends a five-fold strategy for reducing losses from disasters:

- Strategies to reduce disaster losses need to be mainstreamed
- Infrastructure investment to incorporate DRR

[23] *Mainstreaming Disaster Risk Reduction in Sub-national Development and Land Use/Physical Planning in the Philippines, Published by the National Economic and Development Authority, United Nations Development Programme and European Commission Humanitarian Aid*

- Social safety nets for the vulnerable, particularly through Government provisions;
- Early warning capacities and information campaigns supported by Governments;
- Pre-crisis emergency and contingency planning.

With an aim to reduce disaster risk, SAARC Countries have agreed to Delhi Declaration in August 2006 for adopting regional disaster risk reduction measures. India being a part of it, has called for adoption of some of the measures related to mainstreaming of disaster management into development policies like:

- Developing tools and methodologies for mandatory disaster risk analysis for major development projects (dams, infrastructure, highways, water management, forest cover reduction and agriculture development projects)
- Encourage systems for decentralized disaster management in the region by strengthening and involving the local authorities in disaster risk reduction and development planning

India has also agreed to combat climate change and environmental challenges under SAARC declaration in Aug 2008, which include problems due to sea-level rise, deforestation, soil erosion, siltation, droughts, storms, cyclones, floods, glacier melt etc .

Under the draft 12th Five Year plan (2012-17), India has planned to adopt following measures for incorporating disaster risk reduction measures in development planning and Mainstreaming Disaster Management into development

- Review of building by-laws and their adoption
- Mainstreaming mitigation in Rural Development Schemes
- Disaster Awareness in school curriculum
- Financing disaster management through five year plans

The Eleventh Five Year Plan [2007-2012] emphasizes mainstreaming disaster risk management into the development process by looking critically at each activity that is planned, not only from the perspective of reducing the disaster vulnerability of that activity, but also from the perspective of minimizing that activity's potential contribution to the hazard. It stressed that it is essential that every development plan being formulated in the country incorporates elements of impact analysis, risk reduction and the 'do no harm' approach.

The DM Act 2005 mandates State government to ensure that the integration of measures for prevention of disaster or mitigation by the departments of the Government of the State in their development plans and projects and reduce or mitigate the vulnerability of different parts of the State to different disasters (section 38 e.g.f) and review its policies, rules and regulations, with a view to incorporate therein the provisions necessary for prevention of disasters, mitigation or preparedness (section 39 b.c)

Integrating DRR in departmental plans

This section is mentioned in detail in the prevention & mitigation, preparedness and capacity development chapters, however this is intentional, in order to avoid the need for undue

cross-reference. Along with all the points mentioned in the above chapters, to effectively mainstream the DRR process in departmental plans.

The following administrative measures shall be taken up:

- All state departments and agencies will designate nodal officers responsible for disaster management activities and for the effective formulation and implementation of the DM plans.
- All stakeholder agencies will also carry out regular mock drills and tabletop simulations for testing these plans.
- SEC shall ensure mainstreaming of disaster risk reduction in the developmental agenda of all existing and new developmental programmes and projects, which shall incorporate disaster resilient specifications in design and construction.
- SEC shall encourage all stakeholders to set up appropriate institutional mechanisms to ensure that departmental DM plans are not only implemented but also closely monitored vis-à-vis specific targets.
- Risk assessment and impact assessment (with focus on disaster risk reduction) shall be mandatory processes for all departments to formulate and evaluate their DM plans.
- The DM plans will incorporate all the features of the EOCs including their establishment and operations.
- SEC shall ensure undertaking regular inspections/ monitoring of structural works and implementation of required restoration/strengthening measures prior to emergency in the hazard prone areas by the respective agencies/departments.
- Encourage preparation of community preparedness plans to address their own special features and outline the linkages of the various state support systems and the jurisdiction of each of these departments.
- The existing plans will be modified, where required, in order to streamline and optimise the response systems. These plans must indicate the officer responsible for carrying out specific tasks along with timelines for implementation.
- Documentation is an essential component of post-disaster management for assessing the consequences of disasters, and identifying initiators and factors that affect mortality and morbidity with respect to time variables. In view of this, necessary SOPs for the complete documentation of the disaster incident will be laid down as a part of DDMP.

Integrating DRR components in National and State Development Schemes

Mainstreaming DRR in planning can guide development and allocate resources toward the protection of life and assets, restoration of productive systems and livelihoods, regaining market access, and rebuilding social and human capital and physical and psychological health. Development plans therefore take on a critical role in disaster risk management.

The process of mainstreaming DRR into development planning needs to have appropriate tools and methodologies along with political commitment, public understanding, scientific

knowledge and know-how, responsible risk sensitive development planning and practice.

National and state level development schemes play crucial roles for the socio-economic development of community. These schemes target huge population every year and are allocated large amount of funds for their implementation. The SEC, through all national and state schemes, would strategically address and encourage all department and agencies to reduce vulnerability & risks through integration of DRR through structured framework and operational measures.

Integrating DRR in departmental plans

This section is mentioned in detail in the prevention and mitigation, preparedness, and capacity development chapters. However, its inclusion here is intentional in order to avoid the need for undue cross-referencing. Along with all the points mentioned in the above chapters, to effectively mainstream the DRR process in departmental plans, the following administrative measures shall be taken up:

- *All state departments and agencies would designate nodal officers responsible for disaster management activities and for the effective formulation and implementation of DM plans.*
- *All stakeholder agencies would also carry out regular mock drills and tabletop simulations for testing these plans.*
- *SEC would ensure mainstreaming of disaster risk reduction in the developmental agenda of all existing and new developmental programmes and projects, which shall incorporate disaster resilient specifications in design and construction.*
- *SEC would encourage all stakeholders to set up appropriate institutional mechanisms to ensure that departmental DM plans are not only implemented but also closely monitored vis-à-vis specific targets.*
- *Risk assessment and impact assessment (with focus on disaster risk reduction) shall be mandatory processes for all departments to formulate and evaluate their DM plans.*
- *The DM plans would incorporate all the features of the EOCs including their establishment and operations.*
- *SEC shall ensure undertaking regular inspections/ monitoring of structural works and implementation of the required restoration/strengthening measures prior to emergency in the hazard prone areas by the respective agencies/departments.*
- *Encourage preparation of community preparedness plans to address their own special features and outline the linkages of the various state support systems and the jurisdiction of each of these departments.*
- *The existing plans would be modified, where required, in order to streamline and optimise the response systems. These plans must indicate the officer responsible for carrying out specific tasks along with timelines for implementation.*
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National and state level development schemes play a crucial role in the socio-economic development of a community. These schemes target a huge population every year and are allocated large amounts of funds for their implementation. The SEC, through all national and state schemes, would strategically address and encourage all departments and agencies to reduce vulnerability and risks by integrating of DRR through structured framework and operational measures.

Some key measures at policy level and delivery mechanisms that can be incorporated in these national and state schemes are tabulated here:

Table 5-1: Integrating DRR in national and state schemes/ services

Schemes/ services	National/ State	Policy level	Administrative/ Delivery Mechanism
Housing **IAY (Indira Awaas Yojana)**	National	• Promoting region specific hazards resilient design • Promoting use of eco-friendly and locally available materials, without compromise in the quality of structures. • Promoting climate resilient structures • 'Build Back Better' and 'Build Back Safer' approach for reconstruction and rehabilitation • Technology Demonstration Units (TDUs) with multi-hazard disaster resistant technologies for promotion of safe construction practices • Consideration for special needs groups	• Allocating land which is not hazard prone • Ensuring strict enforcement of national and local building laws as well as land allotment laws • Ensuring provision of basic amenities like domestic water and sanitation along with housing • Strengthening the techno-legal regime and the compliance to local building laws in hazard prone areas • Developing simplified construction guidelines in regional languages for hazard resistant construction (flood and earthquake) as per National Building Codes/standards for various seismic and flood zones. • Certification of masons • Creating a database of master trainers • Inclusion and priority for special needs groups
Agriculture	State	• Greater private participation in crop	• Strengthening Crop insurance,

Harit Rajasthan		insurance • Climate change adaptation should be considered during planning of projects. Bio-farming, less water intensive crops, etc • Water use regulations for farming • Considerations for maintaining of ecological balance specifically for programs in arid and desert areas • Lab to field programmes need to be strengthened • Food security through establishment of grain banks • Consideration for special needs groups	weather insurance linkages with marginal farmers • Strengthening Agriculture extension, Contingency crop planning • Provision of grain storage facilities and livestock shelters - creation of flood resistant storage facilities for food grains/seed stocks including post harvest management (storage, food drying, food processing) • Inclusion and prioritizing people with special needs
Targetted Public Distribution System (TPDS)	National/ State	• Elderly people are taken care of in programmes like - Annapurna and Antodiya • Prepositioning of foods supplies	• Coupon system for strengthening PDS • Upgrading and strengthening ware housing processes to minimize the loss of grains due to negligent handling
Natural Resource Management **Integrated Watershed Management Programme (IWDP, DDP, Hariyali),**	National/ State	• Inclusion of climate change considerations in common guidelines for watershed development • Involvement of NGOs in implementing projects	• Strengthening delivery mechanisms • Strengthening planning processes to evolve a common plan for NRM and water resources at GP level • Strengthening community based

Harit Rajasthan			monitoring processes
Employment **MGNREGS (Mahatma Gandhi National Rural Employment Guarantee Scheme)**	National	• Resolution for prioritizing DRR related works in MGNREGS and guidelines for creating shelf of work considering different climatic, seismic and geo hydrological zones • Pre positioning of grains and food items for monsoon and inaccessible terrains • Consideration for special needs groups	• Technical assistance team (on the lines of JNNURM) would be formed to assist state and block governments • Introducing workplace safety regulations • Including and prioritizing people with special needs
Urban Development **JNNURM (Jawaharlal Nehru National Urban Renewal Mission)** **Rajasthan Urban Infrastructure Development Project (RUIDP)**	National/ state	• General Development Control Regulation (GDCR) to address safe construction practices and land use to avoid development that increases hazard risks • Encourage low energy input projects for urban environmental facilities • Barrier free access concept	• Hazard risk assessment in land use planning and zoning • Local geo hydrological considerations are one of the most significant issues to be considered in large infrastructure projects like roads, bus rapid transit systems, and metro lines
Health and Insurance **NRHM (National Rural Health Mission), GVK EMRI 108 Ambulance Service, State AIDS Control Programme, Rajasthan Health**	National/ State	• Hospital safety audit for ensuring safe health services • Private sector participation for promoting effective delivery in micro heath insurance • Promoting risk reduction through accurate pricing of risk by insurer	• Effective disease surveillance systems • Incentive schemes for outreach for grass root workers like ANM and ASHA for effective coverage • Service delivery under Janani Surakshya Yojana (JSY) would be

System Development Project		• Extending pension schemes to senior citizens, Widows affected by disaster • Consideration for special needs groups	strengthened. • Sexual Reproductive Health (SRH) during emergencies would be intrgated with health development plans. • Strengthening civil society engagement in PHC and other programmes • Including and prioritizing people with special needs
Education **Sarva Shiksha Abhiyan (SSA)**	National	• Inclusion of learning material on risk awareness, preparedness and preventive measures in school curricula. • Integration of DRR modules in the regular training course of the "Teachers' Training Institutes" • Evolving a performance based incentive and penalty system • Involvement of accredited NGOs based on performance indicators	• Hazard resilient primary and secondary school buildings and infrastructure • Recognition of special needs of vulnerable groups including disabled children • Training in life saving skills such as first aid, search and rescue, and swimming to school children, teachers, and education administrators • Including and prioritizing people with special needs • Extensive capacity building programme for students would be conducted
Women and Child	National	• Involvement of CBOs and private partnerships to improve service	• Strengthening community

development		delivery of ICDS	monitoring process
Integrated Child Development Services (ICDS), Mid Day Meal (MDM), Kaleva (breakfast) Yojana **Rajiv Gandhi Scheme for Employment of Adolescent Girls (RGSEAG), CM's 7 point programme for women empowerment**		• Safer flood and earthquake resistant anganwadi buildings. • Facilities for child friendly toilets and latrines with sufficient water and hand washing facilities. • Performance indicators on health and nutrition and incentive schemes for ICDS functionaries • Consideration for special needs groups • Micronutrient fortification of food to address silent and disguise disaster like malnutrition.	• Training to ANMs and AWWs • Pre positioning of ORS before summer • Pre positioning of food before monsoon • Trauma Counselling (Post disaster)
Tourism **Rajasthan Tourism Development Corporation (RTDC)**	State	• Guidelines for ensuring conservation, safety and infrastructure development or tourist destinations and heritage places • Eco-tourism, Indigenous Tourism	• Local community engagement in conservation and development • Identification, proper registration, security briefing for tourists.
Water and Sanitation **Swajaldhara, Total Sanitation Campaign, Nirmal Gram**	National	• Sustainable water use through water recharging, conjunctive use of water, ground water use regulations etc.	• Scientific management, handing and recycling of domestic waste

Gender Mainstreaming

Women and children are the most vulnerable in any disasters. They suffer the most and are attended to the least. Thus the need of gender mainstreaming demands more attention of policy makers. Also, mainstreaming gender perspectives into the DRR process offers new opportunities to advance gender equality in the socio-economic development process.

Promoting gender equality in DRR requires a multi-sectoral and multi-stakeholder approach. Gender and DRR issues need to be addressed through political, social, economic, scientific and technical, and humanitarian approaches, where everyone can make useful contributions.

Key principles of gender mainstreaming

The gender mainstreaming process has five key principles relevant to disaster management:

- Mainstreaming gender perspectives into all disaster management initiatives;
- Building capacity in women's groups and community-based organizations;
- Ensuring gender mainstreaming into communications, training and education;
- Ensuring opportunities for women in science and technology; and
- Ensuring gender mainstreaming into programme implementation, monitoring and evaluation.

Gender mainstreaming initiatives in Rajasthan

One of the major initiatives by the Government of Rajasthan on gender mainstreaming includes adopting a process of gender sensitive budgeting since 2009-10. Departments like Agriculture, Animal Husbandry, Medical and Health, Social Justice have already formulated their layout considering gender budgeting principles. All other departments of the state have been advised to incorporate gender budgeting in their annual layout and perspective plans.

To enhance and strengthen the process of gender mainstreaming in disaster management, the State Government shall:

- *Commit to gender analysis and gender mainstreaming through enhanced cooperation and collaboration between departments responsible for disaster risk reduction, climate change, poverty reduction and gender issues;*
- *Review State policies, strategies and plans and take immediate action to mainstream gender into State development policies, planning and programmes;*
- *Ensure equal access to natural hazard early warning systems for women and men;*
- *Establish gender specific data and statistics on impact of disasters, carry out gender-sensitive vulnerability, risk and capacity assessments and develop gender-sensitive indicators to monitor and measure progress;*

- *Increase awareness of the public and media on gender sensitive vulnerabilities and capacities in disasters and gender specific needs and concerns in disaster risk reduction and management;*
- *Support research institutions to study the cost-benefit and efficiency of gender-sensitive policies and programmes in disaster risk reduction, climate change adaptation and poverty reduction;*
- *Support gender-sensitive financial risk-sharing mechanisms, including risk insurance and reinsurance;*
- *Improve disaster preparedness, response and contingency planning from a gender perspective and make them respond to the specific needs and concerns of men and women;*
- *Increase women's participation in disaster relief coordination and secure equal access to disaster relief assistance between men and women;*
- *Build and enhance the capacities of professional communities and pertinent national institutions to enable gender mainstreaming into all development sectors*

Mainstreaming people with special needs

The term "special needs" is widely used within the disaster services and the emergency management world. It generally refers to an extremely broad group of people with disabilities, people with serious mental illness, minority groups, children, and the elderly**24**. These groups represent a large and complex variety of concerns and challenges. Many of these groups have little in common beyond the fact that they are often left out of programs, services and emergency planning.

In disaster management activities, it is important to think about disability broadly. Individuals with disabilities include those with one or more activity limitations such as a reduced or inability to see, walk, speak, hear, learn, manipulate or reach controls, and/or respond quickly. Some disabilities are quite visible, while others may be hidden such as heart disease, emotional or psychiatric conditions, arthritis, significant allergies, asthma, multiple chemical sensitivities, respiratory conditions, and some visual, hearing and cognitive disabilities. Emergency planning can be hampered by uncertainties about how to identify special-needs populations and how to address the needs for assistance across several distinct groups within the community. However, adopting a function-based approach to planning for special-needs populations allows planners to group overall response resources on the basis of core functional areas.

Preparing for the function-based needs of the community is a paradigm shift in emergency planning as it fosters the development of an operational set of predictable supports.

24 Centers for Disease Control and Prevention undated

The five functional areas in which individuals with special needs may require support during and following a disaster are described as follows[25]:

- ***Maintaining Independence:*** Individuals who rely on assistance in order to be independent in daily activities may lose this support during an emergency. This support may include supplies (diapers, catheters, ostomy materials, etc.), durable medical equipment (wheelchairs, walkers, scooters, etc.), and attendants or caregivers.
- ***Communication***: Individuals who have limitations that interfere with the receipt of and response to information may need that information provided in ways they can understand and use, and from authorities they trust. They may not be able to hear verbal announcements, see directional signage, or understand how to get assistance because of hearing, vision, speech, cognitive, or intellectual limitations, and/or limited English proficiency.
- ***Transportation*****:** Individuals who cannot drive or who do not have a vehicle may require transportation support for successful evacuation. This support may include accessible vehicles (e.g., vehicles equipped with lifts or otherwise suitable for transporting individuals who use oxygen) and mass transportation.
- ***Supervision*****:** Individuals who rely on caregivers, family, or friends in daily life may be unable to cope in a new environment, particularly if these individuals are children or have intellectual or psychiatric disabilities.
- ***Medical care*****:** Individuals who are not self-sufficient or who do not have adequate support from care-takers , family, or friends may need trained medical assistance with managing unstable, terminal, or contagious conditions; managing intravenous therapy, tube feeding, and vital signs; receiving dialysis, oxygen, and suction administration; managing wounds; and operating power-dependent equipment to sustain life

The plans would be sensitive to the special needs of vulnerable sections such as pregnant, lactating mothers, children, elderly, physically and mentally challenged persons. The concerns of women would be specifically addressed.

25 http://www.disabilitypreparedness.gov/paradigm.htm

Chapter 6 - Preparedness

Preparedness is a pre disaster measure, which is defined as "the knowledge and capacities developed by governments, professionals, organizations, communities, and individuals to effectively anticipate, respond and to recover from the impacts of likely, imminent or current hazard events or conditions".

Disaster preparedness activities involve forecasting and taking precautionary measures prior to an imminent threat when advance warnings are possible. Preparedness planning improves the response to a disaster in terms of timely and effective rescue and relief operations. It involves the development and regular testing of warning systems (linked to forecasting system) and plans for evacuation or other measures to be taken during a disaster alert period to minimize potential loss of life and physical damage.

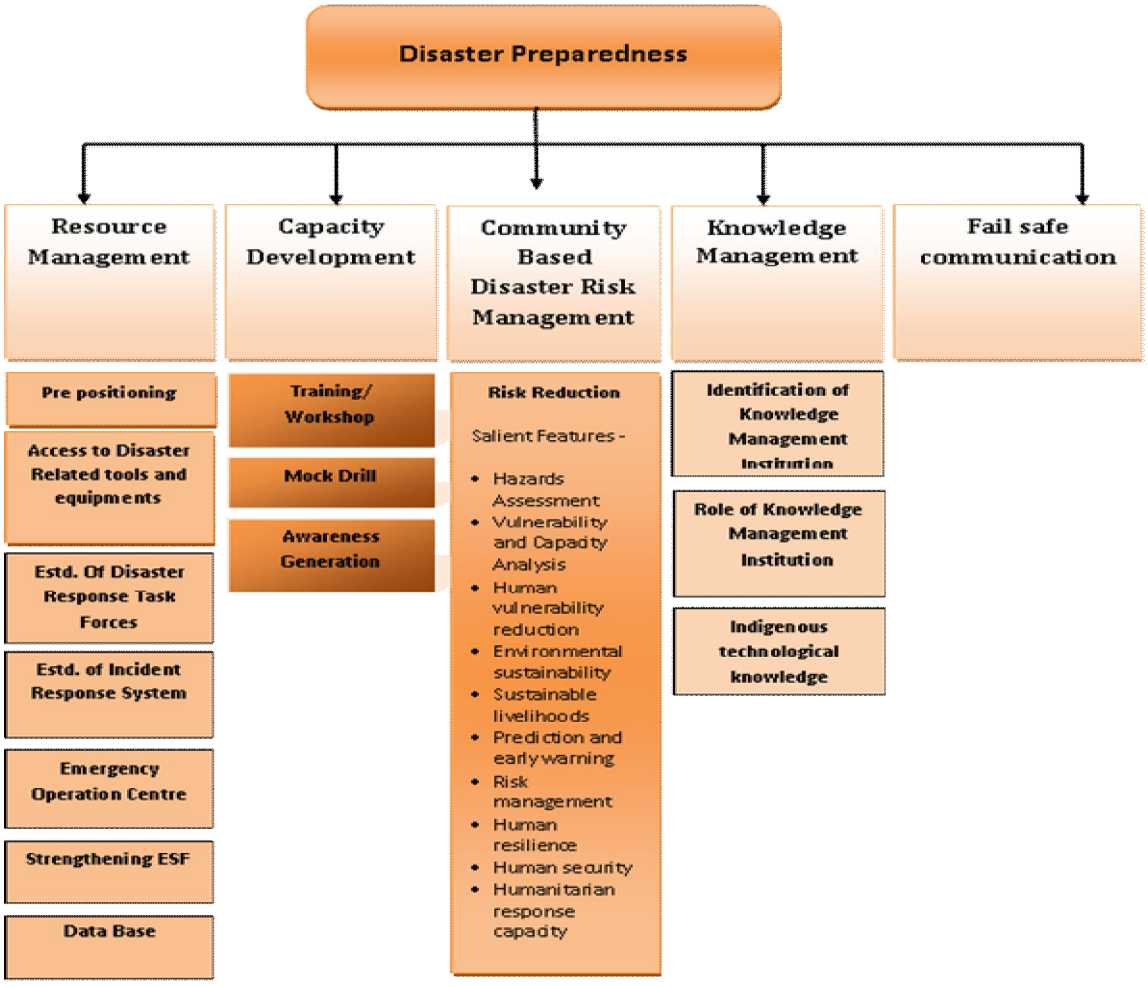

Figure 6-1: Schematic representation of disaster preparedness

Disaster preparedness is dynamic requirement and aligned to other aspects of disaster management such as prevention, mitigation and response, and hence should be understood in context with overall disaster management.

The maintenance of effective disaster preparedness involves the requirement of up-dation of the inventories and to brush up and enhance the capacities to attain the desired level of preparedness. [26]

All departments, agencies and other stakeholders will accord the highest priority to building up their own DM capabilities. New institutional mechanisms would be built specifically in those sectors of DM where none of the existing agencies are working towards the building of required capacities.

Early warning

It has been experienced in the past that destruction from natural hazards can be minimized by the presence of a well functioning communication / warning system. A well-prepared community and administration needs to have its communication/early warning system in place to enable precautionary & mitigation measures on receiving warning for impending disasters and in the process minimise loss of life & property.

It is most essential to establish, upgrade and modernise the forecasting and early-warning systems for all types of disasters. The nodal agencies responsible for monitoring and carrying out surveillance, for specific natural disasters, will identify technological gaps and formulate projects for their up gradation, in a time-bound manner.

At the state/ district levels, Information and Communications Technology (ICT) could play an important role in establishing effective early warning systems for successfully conducting emergency preparedness and response activities. ICT can play a significant role in highlighting risk areas, vulnerabilities and potentially affected populations by producing geographically referenced analysis

ICT for early warning systems

- The main functions supported by the tools include the following:
- Information collection and sharing
- Decision support systems, through the integration of geo-spatial data
- Communication and dissemination
- Emergency preparedness and response

Information collection and sharing

Data from different sources are collected and monitored in real or near real time and analysed to generate a warning alert if the combination of factors point to the likelihood of a disaster.

[26] *W Carter Nick, , Disaster Management, A disaster manager's handbook, Asian Development Bank*

There are a number of ICT tools available to help systematic collection of data and undertake risk assessments so that the behaviour of hazards and socio-economic vulnerabilities of communities can be better understood. These tools can be ground-based (automated hydro-meteorological observing systems, broadband seismometers, portable digital cameras and electronic handheld devices), airborne (radar) or space based (optical and radar satellite remote sensing, global positioning systems); all are used to acquire data for various types of hazard monitoring and at different stages of disaster risk management.

Decision support systems

Promoting synergies in hazard monitoring and risk identification through the functional integration of scientific and technical organizations working in meteorology, geology and geophysics, oceanography and environmental management, among other fields, has been identified as a key action towards reducing disaster risks. It is equally important to reflect socio-economic perspectives in the process. Relevant organizations should have the capability to integrate hazard and risk information, as well as to identify and monitor the parameters influencing the hazards and should have access to decision support tools.

Decision support tools include spatial information systems designed to assist in integrating and analysing vast amounts of historical and real-time data and in displaying the data in user-friendly ways. Geographic information systems can superpose multiple layers of spatial information derived from the processing and interpretation of remotely sensed data (such as land use and geomorphology) with other geographical and cartographic information (such as elevation and slope). This information can be linked to statistical databases (for example, those with figures on population density), resulting in maps on which high-risk areas can be matched with the socio-economic features of a society.

Communication and dissemination

Voice and data communication continues to be of crucial importance in the context of disaster management. Some tools, such as traditional radio and television, are ideal for one-way mass communication, as they have high penetration rates in most countries. Other types of radio tools, such as community, amateur, shortwave and satellite broadcasting are also suitable for transmitting information for universal coverage. The Internet, e-mail and mobile telephones are becoming increasingly important broadcasting tools. Cellular phones provide mobility, two-way communication, location-based services and privacy. As more poor people in many developing countries of Asia and the Pacific, obtain access to such phones. Special attention must be given to making new content and early warning alerts suitable for these devices.

Emergency preparedness and response

National and community disaster preparedness and response capabilities should be developed at all levels in the government as well as by communities. In addition to planning for adequate evacuation routes, emergency shelters and emergency stockpiles of food, water and medicines, efforts must be made to ensure reliable

communication systems, as well as efficient operating procedures for the disaster-affected areas. Such critical infrastructure, facilities and communication systems can be developed using ICT tools, including space-based systems.

Risk assessment maps, generated by geographic information systems, play a critical role in determining safe locations for emergency shelters and evacuation routes. Disaster management systems and field reporting mechanisms are key tools for understanding and managing relief and recovery activities, including the relocation of people and the management of the logistics for food, fuel, water, medicines and other critical assets. This logistical information should also be linked to spatial information systems, enabling disaster managers to visualize on a map the correlation of disaster damage and casualties, together with the available and required facilities and supplies.

ICT tools will be used for data reception, forecasting and timely dissemination of information. It will help decision makers at all levels, will present real time dissemination of advance warnings and information to the authorities concerned at various levels and the threatened communities and provide last mile connectivity at the disaster site for control and conduct of rescue and relief operations.

Existing Forecasting and Early Warning Systems

It is most essential to establish, upgrade and modernize the forecasting and early-warning systems for all types of disasters. The nodal agencies responsible for monitoring and carrying out surveillance, for specific natural disasters, will identify technological gaps and formulate projects for their up gradation in a time-bound manner. ICT tools shall be used for data reception, forecasting and timely dissemination.

Earthquake:

The Indian Meteorological Department (IMD) will be the nodal agency for the monitoring of seismic activity. The operational task of the department is to quickly estimate the earthquake source parameters immediately on occurrence of an earthquake and disseminate the information to all user agencies including the concerned State and Central Government agencies responsible for carrying out relief and rehabilitation measures. The earthquake information is to be transmitted to public information channels, press, media etc. and posted on IMD's Website.

IMD will disseminate details of the magnitude and epicentre to all concerned agencies, which will help to undertake the response appropriately.

Flood, Flash Floods, Dam Bursts, Cloud Bursts Hail Storms

Flood forecasting (FF) enables communities to be forewarned as to when the river is going to use its flood plain, to what extent and for how long. The forecast of a flood may be for the water level (stage forecast), discharge (flow forecast) and area likely to be submerged (inundation forecast) at various points/ particular stations at a specific time.

The methodology adopted for forecasting and dissemination of warning information are as follows:

- Data Collection
- Transmission of Data to the Forecasting Centres
- Data Processing and Formulation of Forecasts
- Dissemination of Flood Forecasts and Warnings

The Central Water Commission (CWC), IMD and the state government will increase the density of the basin-wise network of rain gauge and river gauge stations and establish basin-wise systems of Flood Forecasting and early warning.

Pre-monsoon and post-monsoon inspections of dams will be carried out by experts and subsequent recommendations will be implemented by the state government /SDMA in a fixed time frame to ensure continued service and safety.

Drought/heavy rains/ wind/ cold and heat wave

The IMD is responsible for National Meteorological Services and is the principal government agency in all matters relating to meteorology, seismology and allied subjects.

The IMD is mandated to:

- Take meteorological observations and provide current and forecast meteorological information for optimum operation of weather sensitive activities like agriculture, irrigation, etc.
- Warn against severe weather phenomena like tropical cyclones, north-westerly dust storms, heavy rains and snow, cold and heat waves etc., which cause destruction of life and property.
- To provide meteorological statistics required for agriculture, water resource management, industries, oil exploration and other nation building activities.

IMD issues Drought Outlooks through which it forecasts rainfall and presents scenarios of drought conditions throughout the country.

Automatic weather stations being set up by different agencies, including IMD, will also include moisture sensors for obtaining information about the soil moisture levels under natural environment. Remote sensing applications will corroborate on a weekly basis their findings on the crop health. IMD will have a dedicated webpage on drought monitoring and forecast in its web portal.

Flash floods forecasting and warning systems using Doppler radars has been installed by the India Meteorological Department (IMD).

Biological Disasters –

Integrated Disease Surveillance Programme (IDSP)[27] is a decentralized, State based Surveillance Program. It is intended to detect early warning signals of impending outbreaks and help initiate an effective response in a timely manner. Major components of IDSP are:

- Integrating and decentralization of surveillance activities;
- Strengthening of public health laboratories;
- Human Resource Development – Training of State Surveillance Officers, District Surveillance Officers, Rapid Response Team, other medical and paramedical staff;
- Use of Information Technology for collection, collation, compilation, analysis and dissemination of data

In case of any unusual health events or epidemics, anyone can call the toll free number 1075.

A decentralised state-based system of surveillance for communicable and non-communicable diseases would be established so that timely and effective public health action can be initiated in response to health challenges.

The state would improve the efficiency of the existing surveillance activities of disease control programmes and facilitate sharing of relevant information with the health administration, community and other stakeholders to detect disease trends over time and evaluate control strategies.

The IDSP would be operationalised at all district levels to detect early warning signals for instituting appropriate public health measures. The surveillance programme will be integrated with the chain of National, state government and private laboratories. Real-time monitoring with information shared at the various levels of the health care system will be performed.

Fire, CBRN, terrorism and accidents

Table 6-1: Fire, CRBN, terrorism and accidents

Sr.	Hazards/ Disaster	Agencies	EWS	Dissemination Process	Stakeholders
1	Fire (onsite), Wild Fires, Ammu	Fire Department (Urban Local Bodies),	Fire/ smoke detector, Com	Sirens, automated safety	ULB Deptt., Forest, Home, Onsite

27 http://idsp.nic.in/

	nition Depot-Fire	Local Police station, District Magistrate, Army	munity based systems, Remote sensing applications	systems	workers, Offsite communities, Fire Deptt., Health Deptt.
2	Industrial, Chemical and Nuclear Accidents	Mines and Petroleum, Energy, Industries Department, Local Police stations,	Alarm by industrial unit, chemical, radioactive detectors/ sensors, Remote sensing applications	Sirens, Radio, electronic/ print medium and mobile technology, Cordon	Fire, Police, Health, Experts, Home, Onsite workers, Offsite communities, Electronic media, print media, radio, mobile operators
3	Rail and Air Accident	Railways, Police, District Administration, Local Police stations, Air Traffic control (ATC), AAI, Air	-	Radio, electronic/ print medium and mobile technology, Radars.	Home, Electronic media, print media, radio, mobile, communities

		force, Air defence.		, DGCA, Air force, Army
4	Terrorism	Intelligence Bureau (IB), RAW, Military Intelligence Service (MIS), ATS, MHA, State Home Department. Security services working as per PSRA Act.	Collect, collate, comprehend, interpret and disseminate.	Home, Central and State Security Forces, Army, NSG, Special Forces

Establishment of Disaster Response Force

An objective analysis of the state's own capacity to fight disasters would be carried out in terms of Resources, Skills and Information availability.

Search and Rescue Teams

Specialized Search and Rescue Teams consisting of fire service professionals, police, civil defence volunteers, doctors, paramedics, structural engineers etc. would be constituted by the State Government according to the requirements of disaster management emerging from the vulnerability profile of the State.

State Disaster Response Force (SDRF)

SDRF has also been constituted in the State with the assistance of RAC and is stationed at 3 locations i.e. Jodhpur, Jaipur & Kota. Initially, it is comprised of trained and experienced personnel of RAC. The force has been provided with expertise training and equipment to serve as state's response team during disasters. The SDRF will play a pivotal role in any disaster, especially during the first 72 hours. Therefore, raising more battalions will be essential.

Within the SDRF, selected personnel shall be trained on specializations, for example, personal protection, evaluation of radiation exposure, decontamination, and on-field radiation injury management. Further, these personnel will facilitate the task of Quick Reaction Medical Teams (QRMTs)/ Quick Reaction Teams (QRTs)/ Medical

First Responders (MRFs), etc., to provide the necessary assistance at times of Chemical disasters and Chemical Terrorism Disasters (CTD). Likewise, it will be applicable for other disasters too.

It would be ensured that the teams have the latest equipment for locating survivors in the debris. The SDRF battalions would also be provided with communication equipment for establishing last mile connectivity.

Urban Search and Rescue Team

Disasters in highly populated urban areas require specialized response. For this purpose, specially trained Urban Search and Rescue Teams would be constituted by strengthening and reorienting the Fire Services, Police Dog Squads and Civil Defence personnel in all Big Cities, the State capital and other vulnerable populous urban centres. The Integrated Fire Services would function as multi-hazard response units.

Local Search and Rescue Team

At the local level, retired Army and Police personnel, Civil Defence and Home Guard volunteers would be organized and trained to perform initial Search and Rescue operations till the arrival of the specialized teams. Local S&R Teams would be a constituent of the local Disaster Management Teams and adequate training would be provided to the members.

Apart from the above, Community volunteers/ representatives would be identified and trained on search and rescue operations through community Based Disaster Management (CBDM) programme.

Medical First Responders (MFRs)

Disaster Medical Assistance Teams should be fully equipped with mobile hospital units having OT, Pathological laboratories, ICU, X-Ray equipment and the standard cache of medicines and equipments. Epidemic prevention measures and trauma counselling should be specially incorporated in the medical plans. Disaster specific medical plans will be prepared by the state Department of Health, incorporating the special needs.

MFRs would be deputed from the districts, reinforced by those from the state and the centre. The MFRs during an emergency/ disaster situation will triage the patient, provide basic life-support, if required, at the site, and transport patients to the nearest identified health facility along with collection and dispatch of biological and environmental samples.

Establishment of Incident Response System (IRS)

The IRS is an effective mechanism for reducing the scope for ad-hoc measures in response. It incorporates all the tasks that may be performed during DM irrespective of their level of complexity.

The IRS identifies and designates officers to perform various duties and to get them trained for their respective roles. If IRS is put in place and the stakeholders are trained and

made aware of their roles, it would greatly help in reducing chaos and confusion during the response phase. Hence, IRS brings in greater quality and accountability for immediate response. IRS is a systematic approach for responding to a disaster scenario. This encourages the government systems to be better prepared to strategies for effective response in an aftermath of a disaster.

The state would depute its officers to undertake necessary training in IRS in a phased manner. The State DM&R Department would also prepare and finalize the Standard Operating Procedures (SOPs) required for putting the IRS in place.

Emergency Operation Centre (EOC)

EOC is a location / centre where the coordination of information and resources takes place. The EOC is not an incident command post; rather, it is the operations centre where coordination and management decisions are facilitated.

The EOC at the state and district levels are already established and are located in the Secretariat office at the state level and District Magistrate Headquarters at all district levels. EOCs would help for effective coordination of all stakeholders that includes human resources, relief supplies and equipment required to combat disasters. SOPs for the EOCs would be developed by the state government and integrated within the framework of the ICS, which will take advantage of modern technologies and tools, such as GIS maps, scenarios and simulation models for effectively responding to disasters.

Strengthening Emergency Support Functions (ESF)

During the emergencies of lesser gravity, each department/agency within the State Government performs its specialized tasks according to the agency's internal operating procedures. During major emergencies, however, there is an increased need for coordination of all activities relevant to the emergency response as they relate to the event as a whole. The ESFs are designed to ensure coordination between various agencies for optimal resource utilization and to minimize duplicity. The ESF group is composed of a lead agency (Nodal department) and one or more support agencies. The nodal department is responsible for the coordination of the ESF group as a whole. Each nodal department is responsible for developing its own respective plans and SOPs for carrying out its assigned responsibilities.

During the period immediately following a major disaster or emergency requiring central response, nodal departments would take actions to identify requirements and mobilise and deploy resources to the affected area to assist the district administration in its response actions under designated ESFs.

SEC would identify the ESF's and the primary and support agencies associated with it. The major ESFs are:

Response Functions	*Human Needs Functions*
➢ *Search and Rescue*	➢ *Food*

➢ *Relief Supplies (Lifeline)*	➢ *Drinking Water* ➢ *Shelter* ➢ *Cash Relief*
Services and Support Functions ➢ *Public health and Sanitation* ➢ *Power/ Energy* ➢ *Transport* ➢ *Public Works and Engineering*	*Recovery Functions* ➢ *Help lines*
Communications Functions ➢ *Communication* ➢ *Media*	*Information and Planning Functions* ➢ *Information and Planning*

Knowledge Management

Knowledge management means getting the right information to the right people at the right time, and helping people create knowledge and share and act upon information in ways that will measurably improve the performance of all stakeholders. . Resources are seldom a constraint to effective response of disasters, but knowledge and timely convergence of resources seems to be a far bigger challenge than developing resources themselves.

Hence, effective Knowledge, resource and skill management can greatly influence the preparedness, mitigation and response strategies.

Information is not **knowledge**

Information is usually simple "***data***" in some sort of form (numbers, text, images, sound, etc.)

Knowledge is**:**
"a mix of framed experience, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information"

Wisdom is more than just ***Knowledge.***

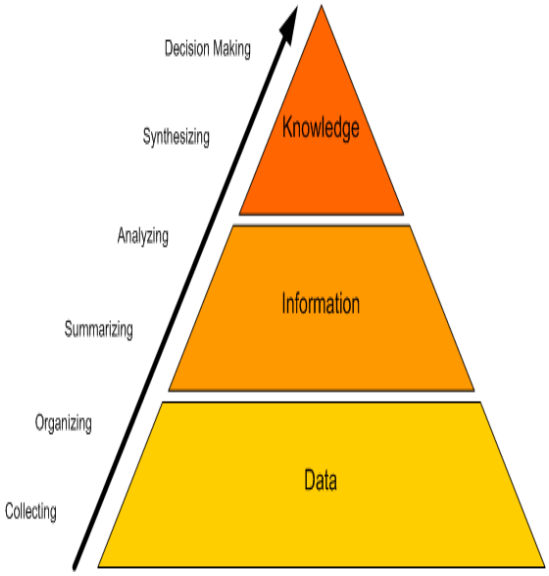

Figure 6-2: Knowledge & Information Pyramid

The benefits of Knowledge Management are focused on:

- Being always prepared
- Reducing risk likely to be caused by Disaster
- Improved Decision Making
- Improved Strategic Planning,
- Faster Development of New Technical Approaches
- Leveraging existing assets to reduce cost, risk and cycle time
- Quick and Robust Problem Solving
- Increased Versatility of the Workforce

Centre for Disaster Management of the State would work as a think-tank to the Disaster Management & Relief Department. It would carry out research, documentation of the best practices, networking with the National Institute of Disaster Management (NIDM) and other institutions, and would focus on the Knowledge management, training and human resource development needs of the State. Beside this there are various other stakeholders like the corporate sector who have the capacity to both assist the state in times of emergency and also in capacity building exercise. For example Cairn India in Barmer has fire tenders that could be of use to the respective district. Similarly DCM in Kota could be used to train small industries on handling of hazardous chemicals so could NTPC, Anta on providing training on Fire. The private sector could be engaged on mutual aid basis or on a Public-Private Partnership model.

Database

There is a need to map the resources of all line departments and feed them in the database of the India Disaster Resource Network (IDRN), India Disaster Knowledge Network (IDKN) and Corporate Disaster Resource Network (CDRN). The state also has a plan to create a Rajasthan State Disaster Resource Network (RSDRN)

The database that needs to be collected and complied is as follows:

1. GIS based spatial maps of vulnerable areas and capacities/resources.
2. Building level GIS based database development.
3. Important contact persons, phone/ mobile numbers, locations, installed capacities etc.
4. Database of relief material and suppliers
5. Database of fire fighting resources and places of availability and service providers
6. Database of heavy equipment holders like trucks, dumpers, earthmovers, cranes and drill machines etc. their places of availability and service providers.
7. Database on truckers, transporters, places of availability and service providers
8. Database of trained masons and construction workers
9. Database of relief workers: search and rescue workers, water and sanitation engineers, shelter engineers, public health experts, agriculture and livelihood experts, social workers
10. Database of NGOs, CBOs and voluntary organizations
11. List of private companies and the resources that they are willing to provide to other stakeholders including government through public private partnership.
12. Database of hazard specific specialists, trainers on Disaster Management and first response like search and rescue, fire fighting, evacuation, emergency response, and first aid.
13. Database of technical and research institutions
14. Database of medical facilities, capacities for Mass Casualty Management, and many more.

SDMA and DDMAs would take proactive steps to verify and update the database regularly. The database collected would be made available to all stakeholders and the public. The importance would be communicated to all departments through awareness, training, and through administrative procedures.

Management Information System (MIS)

A systematic collection of the right data, proper recording of data and timely retrieval of appropriate information relevant to decision-making are all part of a well designed Management Information System (MIS). In context of disaster management, it becomes more important to manage information efficiently, in such a way that it helps making decisions. It considers all key agencies right from the village Panchayat to Block, District and State agencies involved in disaster management.

It also underlines inter and intra departmental information sharing for better coordination.

Disaster Management Information System (DMIS)

The strategy of information management during a disaster requires an effective DMIS.

DMIS should be a web-based application, meaning that the DMIS is not loaded locally on an EOC computer, rather accessed online through the internet to a remote server that hosts the application. The web-based application has the advantage of easy accessibility for all stakeholders. The accessibility to the web-application should have different levels of authorization (Administrative, User). This is to enforce *"need to know*" policy. Also, the application should be user friendly and easy to maintain by the existing staff of EOC.

DMIS would feed in information collected from the field, Emergency Operations Centre (EOC), stakeholders, etc., and will then evaluate the information received. It would then be shared and made available for people to have access to information.

DMIS would be designed in such manner that clear responsibilities of departments/ officials would be cast by SEC/DDMA. The authorities to whom the report has to be sent together with specific time lines, frequency and reporting formats would be decided.

Following are the salient points that should be given due consideration while implementing the DMIS:

- DMIS would be installed and maintained by the state EOC in-charge
- DMIS would contain District, Block, Municipality/ Panchayat level modules.
- SEC would decide on the methodology for collection of relevant information, such as historical disasters and damage statistics at different levels.
- DMIS would have statistics of previous disasters for future reference
- DMIS would have lessons learnt from previous disasters
- DMIS would have some examples of best practices
- DMIS would contain an Emergency Information Management module, which should include disaster tracking and warning dissemination, de-warning, situation assessment and reporting
- DMIS would have a link to GIS databases on vulnerability, risk, and resources available in Rajasthan
- GIS link would contain different thematic layers; for example, road and rail communications, hospitals, police stations, topography, other socio-economic indicators
- DMIS would have vertical and horizontal linkage among various state agencies such as DM&R, irrigation department, police and fire departments etc.
- DMIS would have a database of humanitarian agencies
- DMIS would have a database of volunteers with SDMA, DDMA, and at the block level
- DMIS would have a database of emergency management facilities
- DMIS would have all standard forms related to disaster management to facilitate generation of damage reports, army requisitions, relief distribution reports, etc.
- DMIS design would follow emergency support functions
- DMIS would have disaster specific *Dos and Don'ts* for all visitors to website

Disaster Management and Relief Department along with other line departments and Information Technology experts would design the DMIS, which would act as Decision Support System for coordination and management of various disasters. All

departments, working as nodal agencies for respective hazards would also have DMIS system, which would help them to effectively plan their response for crisis.

Resource Management

Pre- Positioning

When a disaster strikes, the unavailability of supplies or the slow pace in mobilizing them may cause emergency responses to be ineffective and result in increased human suffering and loss of life. Prepositioning or stock piling of goods and other resources would be helpful in sudden onset of disasters. Natural disasters that occur without a transitional phase such as earthquakes. An established structured pre- positioning network would be most beneficial by eliminating the procurement phase of the response that would take place after the onset of the disaster otherwise. As said earlier, a database can be a very important tool for that.

The Disaster Management and Relief Department, on getting an overall picture of all risks, vulnerabilities and resources all over the state, would plan for pre-positioning of goods, equipment and human resources to face any eventualities of a disaster. The following points would be considered:

1) *Assessment of required stockpile or inventory, which can be worked out by studying vulnerability and impact of past disasters or projected future disasters.*
2) *Determining the quality and specification of the goods, which need to be stockpiled.*
3) *Identifying resources and suppliers for goods and materials.*
4) *Planning a network of prepositioning warehouses and agencies so that response can be activated in the least possible time.*

Please visit the IDRN web link for a list of equipments and tools www.idrn.gov.in

Disaster Management Plans

Sustainable development is not possible if disasters are continuously injuring, killing, and damaging infrastructure, property and livelihoods. It is important that the relationship between disasters and development is recognized so that proactive actions can be taken to eliminate or at least to reduce the impact of the consequences of disasters. Therefore, there is a need for Disaster Management Plans at all levels so that timely actions can be taken appropriately.

The plans would also address crosscutting activities in DM, the vertical and horizontal linkages requiring coordination between the state, district and local governments on the one hand and government departments and agencies on the other.

Community Based Disaster Management (CBDM) Plans

The disaster response can be characterized as a command and control structure, one that has a top-down approach. Because of this, we observe, lack of community participation that results in failures in meeting the appropriate and vital humanitarian needs, unnecessary increase in requirements for external resources, and general dissatisfaction over performance despite the use of exceptional management measures.

In case of disasters, the people at the community level have more to lose because they are the ones directly hit by disasters. They are the first ones to become vulnerable to the effects of such hazardous events.

Recognizing these limitations, the CBDM approach promotes a bottom-up approach working in harmony with the top-down approach to address the challenges and difficulties.

Through CBDM, the people's capacity to respond to emergencies would be increased by providing them with more access and control over resources and basic social services. Using a community-based approach in managing disasters certainly would be advantageous.

Communities would be encouraged to prepare their own CBDM plans. These plans would be incorporated into the district and state level plans respectively.

The plans would focus on:

- Analyzing their hazardous conditions prevailing in the area,
- Identification of vulnerabilities and risks caused by hazards
- Communities' existing capacities and practices in coping with such disasters
- Preparedness and mitigation measures to be taken to reduce the impact of the risks.

SEC would plan to implement CBDM programmes in which local communities would be supported in analyzing their hazardous conditions, their vulnerabilities and capacities. To start with, the state government with support from UNDP is already implementing these programmes. SDMA would take Initiatives to scale up the programme.

School safety plans

Each school would prepare its own School Disaster Management Plan, which would be evolved with participation of students, teachers, and parents. The objectives of the plan would be to:

- Identify risks, vulnerabilities and capacities within the school premises
- Identify potential support agencies near the school.
- Prepare an action plan for capacity building- schedule of trainings, mock drills
- Prepare evacuation plan for emergency,
- Enlist procedures and measures for all round safety: fire, labs etc.
- Generate data bank which will have important contact numbers, contact persons, etc.
- Prepare a stockpile of life saving tools, medicines/first aid, clothing material

A city level or block level forum for safe schools would be promoted to enhance peer to peer learning process and share experience and good practices for safe schools

SDMA would ensure that School Management Committee (SMC), which is a statutory body under the Right to Education Act 2008, is responsible for putting in place safety norms for schools, developing infrastructure for DRR, and building capacity of students, teachers and staff for DRR.

SMC would ensure structural and non structural safety of schools and develop a conducive built environment for the safety of children. School should be a safe haven for students in time of disasters rather than a vulnerable place.

Medical Preparedness Plan

Medical preparedness is a crucial component. The surge and casualty handling capacity of all hospitals would be worked out through consultative processes. As the numbers of private hospitals are increasing, they are not appropriately planned to manage casualties resulting from an outbreak of any epidemic or biological disaster.

SDMA and DDMA along with experts and other stakeholders would formulate appropriate procedures for treatment of casualties by private hospitals. The registration and accreditation policy would make it mandatory for all hospitals to have a hospital DM plan.

The Medical preparedness plan would take into consideration the following components:

Hospital DM Plan

Hospital planning would include both internal hospital planning and for hospitals being part of the regional plan for managing casualties for all disasters.

The plan would be 'all hazard', simple to read and understand, easily adaptable with normal medical practices and flexible enough to tackle different levels and types of disasters.

The plan would include development and training to medical teams and paramedics. Capacity building on trauma and psycho-social care, mass casualty management and triage will be incorporated in the plan.

The plan would include development of infrastructure over a period of time and would be able to identify resources for expansion of beds during a crisis.

The quality of medical treatment of serious/ critical patients would not be compromised. The development plan would aim at the survival and recuperation of as many patients as possible.

The hospitals would submit data on their capabilities to the district authorities and on the basis of data analysis, the surge capacities will be decided by the district administration.

It is essential that all hospital DM plans have the command structure clearly defined, which can be extrapolated to a disaster scenario, with clear-cut job definitions when an alert is sounded. Emergency services provided must be integrated with other departments of the hospital.

The hospital DM plan would cater for the increased requirement of beds, ambulances, medical officers, paramedics and mobile medical teams during a disaster. The additional requirement of disease related medical equipment, disaster-related stockpiling and inventory of emergency medicines would also be factored into the hospital DM plan. The DM plan must be strengthened by associating the private medical sector.

All hospitals would develop disaster plans specific to themselves. The plan would be available with the district administration and tested twice a year by mock drills.

Table 6-2: Checklist for hospital DM plan

Checklist:	Elements to be considered while developing a Hospital DM plan
Situation analysis	1. The role and place of the health care facility in the community 2. The hazards and risks that can be reasonably expected
Roles and responsibilities	3. The overall command structure: functions, roles, responsibilities, composition, place 4. Standard Operating Procedures (SOPs) and Supplemental Emergency Response Plans (SERPS – i.e. developed by the various units or departments of the hospital for organizing their own activities) 5. Job descriptions for key personnel (also known as Job Action Sheets)
Triggering the plan	6. The alarm and its processing 7. The activation of the plan and its tiers 8. Mobilizing personnel (e.g. "call back" procedures for staff who are not at work when the incident occurs)
Operational areas	9. Receiving area for disaster patients 10. The Emergency Department 11. The main treatment areas 12. Family and media centres 13. Management of fatalities
Support for operational areas	14. Security 15. Essential supplies (including pharmacy and blood bank) 16. Maintenance of critical equipment 17. Ancillary services 18. Continuity of operations (including evacuation and relocation) 19. Psychosocial support (for patients, families, staff)
Coordinating with other health facilities	20. Coordination mechanisms with other health care facilities (Memoranda of Understanding; Standard Operating Procedures) 21. Medical charts and special forms used in emergency

	situations when the plan is activated; this includes patient tracking 22. Communication systems and sharing of information procedures
Preparedness	23. Training of staff 24. Exercises – Mock drills, simulation, etc. 25. Validation of the plan 26. Revision and updating of the plan 27. Special sub plans for fire, terrorist attacks, Bio terrorism, biological warfare, chemical, and epidemic incidents (as required).

Hospital Safety Plans

The term *health facility* refers to a hospital, clinic, outpost or institution that provides comprehensive medical care to a significant number of people in a given area. Health facilities play a pivotal role in the everyday life of communities. In most instances, the services they render are the primary means of addressing public health needs. By providing emergency services and 24 hour operations during disasters, the community's' dependence on health facilities is greatly magnified and they will be seen as the main resource for prompt diagnosis and treatment[28].

Public health security meant for a disaster-vulnerable community is seriously jeopardized when hospitals, primary health-care clinics and health posts are damaged, equipment destroyed and staffs of these are themselves killed, injured or otherwise affected.

Ongoing preventative health programmes are at best slowed down or interrupted for a time and most, of the, resources are relocated in efforts to provide immediate help to the victims.

The health safety has to meet the needs of accessibility, approachability, reliability and also sustainability in situations of calamity which might recur in the future. All these factors warrant the necessity for active liasoning with local institutions, groups of locally available professionals, right minded architects, and designers. Routine cosmetic repairs have to be accorded less importance than the quality, safety, sanitary and hygiene aspects of health and other institutions. This has to be the new touchstone for effective preparedness. Operation theatres, laboratories and X-ray units within such premises have to be upgraded and each building must be made as user-friendly as possible for injured survivors. [29]

28 Field Manual For Capacity Assessment Of Health Facilities In Responding To Emergencies, Who

[29] Safe Hospital Initiative in the aftermath of the 2001 earthquake in Gujarat (India), A report by Dr Sudip Kumar Nanda, IAS Principal Secretary (Food), Government of Gujarat, India

District Plans

Detailed District level Disaster Management Plans would be re-framed/ re-structured under the supervision of the District Magistrate/ Collectors and would include the elements of mitigation, preparedness and response. The Plan would be developed in consultation with all relevant departments. The Emergency Support Functions of various departments would be listed out in the plan. An inventory of resources in the district would be listed out and updated regularly. The District Disaster Management Committee would coordinate the rehearsal of the plan, if deemed necessary by the District Magistrate/Collector and its yearly updation.

Departmental Plans

Each Nodal Department would prepare its own plan for the respective departments. The plan would be comprehensive and include aspects of mitigation, preparedness and response. The plan would be prepared with reference to the Disaster Management Act 2005, National/ State Disaster Management Policy and State Disaster Management Plan.

All departments would prepare SOPs in consonance with the State Plan. SOPs would be prescribed for activities like search and rescue, medical assistance and casualty management, evacuation, restoration of essential services and communication at disaster sites, etc. The other important activities are provision of food, drinking water, sanitation, clothing and management of relief camps.

Urban Disaster Management Plan

Urban Disaster Management Plans would be drawn up by the Urban Local Bodies, in consultation with the Disaster Management and Relief Department and related sectors. An Urban Disaster Management Expert Group would be constituted by the state government for advising the government and preparing guidelines for Mainstreaming Urban Disaster Mitigation into development processes. The Urban Local Bodies including Municipal Corporations would be the key agencies in the formulation and enforcement of disaster mitigation initiatives.

All plans would have SOPs in consonance with the State Plan. SOPs would be prescribed for activities like search and rescue, medical assistance and casualty management, evacuation, restoration of essential services and communication at disaster sites, etc. The other important activities are provision of food, drinking water, sanitation, clothing and management of relief camps.

Disaster Management Plan for religious places

SDMP would encourage and support all religious places to prepare their own Disaster Management Plans.

Crisis Management Plan (CMP)

Crisis Management Plan at the Hospitals

A crisis management plan would be prepared by all earmarked hospitals. The responsibility for preparation and implementation of the plan lies solely with the medical superintendent of the hospital. Establishing decontamination facilities, training medical personnel, creating awareness of toxicants and their antidotes and collection of biological samples like blood, urine (to be frozen) shall form part of the crisis management plan.

Crisis Management Plan at Religious Places

Mela Authority (Para 207 of Budget announcement 2010 – 2011) is being constituted by the state government for management of various religious and other fairs. Looking to the 'Mehrangarh disaster', the Home department would prepare a crisis management plan for all major religious places especially during the time of festivals.

Crisis Management Plan for emergency situations

The Crisis Management Plan lays down the sequence of actions to be taken by all the relevant agencies in the crisis/ emergency situation.

The Home Department has prepared the crisis management plan for:

a) *Public Disorder:*

Problems of large scale public disorder such as civil disobedience, and major law and order problems simultaneously affecting large parts of the state.

b) *Terrorist Onslaught*
   - *Hostage or terrorist situations requiring specialized handling by the NSG*
   - *Major extremist attack/ suicide attack/ indiscriminate firing;*
   - *Sabotage of vulnerable areas/ points and essential services*
   - *Bomb explosions by hostile elements at historical monuments or communally sensitive places/ places of worship which may enflame passions or cause grave reactions or communal backlash*
   - *Bomb explosions at important government buildings/ vital installations*
   - *Attempts by terrorist to create panic*
   - *Extremist attacks using nuclear/ radioactive/ biological/ chemical/ radioactive agents.*

c) *Large Scale Mutiny, or desertion in , the state police force*

d) *Crisis Management Plan for major natural calamities like earthquake, flood and drought.*

e) *SOPs for CBRN*

The plan has two parts in which, part (i) deals with aspects, which are common to all contingencies/ emergencies and part (ii) comprises SOPs for specific emergencies.

Each department and agency would prepare/ update its internal security schemes/ disaster management plans by incorporating the sequence of actions as mentioned in these Crisis Management Plans.

Chapter 7 - Capacity Development

DM covers a wide range of functions and skills, which include planning, organizing, day to day management activities, multi disaster operations, crisis management, recovery functions and special tasks. Thus, a careful, structural training and orientation programme is required for enhancing competency and organizational/ institutional expertise. Training human resources at all levels would not only improve performance, but also influence the decision at the time of need.

Considering the significance and need to train "people" varying from officers at different levels of the government to various stakeholders that include the private/corporate sector and the community at large, the 13th Finance Commission has earmarked an additional grant of Rs.525 crore for capacity building. It needs to be noted that, capacity development is an important component of preparedness for the management of any disaster and requires all round development of human resources through awareness generation, training, education, R&D, etc. Rs 6 Crores per year for 5 years i.e. Rs 30 Crores have been allotted to Rajasthan for the same purpose.

Capacity development addresses putting in place an appropriate institutional framework, management systems and allocation of resources for efficient response to handle disasters. Therefore, the objective of capacity development is to put in place a systematic functional mechanism with trained human resources.

The following capacity development initiatives would be undertaken to strengthen Disaster Management in the state:

1. Training
2. Mock drills and simulation exercises
3. Disaster Management in curriculum
4. Public awareness
5. Community based Disaster Management Programmes.
6. Access to disaster related tools and equipment
7. Documentation of best practices

The State would give utmost priority to training of DM officials, functionaries, trainers and elected representatives and communities. DM training and orientation of professionals like doctors, engineers, and architects would also be given due importance. The expansion of DM training in educational institutions at all levels including schools, with orientation towards practical requirements will be given due weight age.

Training

Training is the most important, essential and central activity of all capacity development programmes. Trained personnel respond much better to different disasters in time and appreciate the need for preventive measures. Systems, measures and initiatives would be taken to ensure intensive training for building up of human resources,

especially to improve disaster awareness, safety and enhance capabilities of disaster managers at various levels.

The SDMA would plan to execute Disaster Management training and other capacity development activities in a structured and phased manner.

Training Infrastructure

The Administrative Training Institute (ATI) will be supported by the central and state governments to take up disaster management training for state, district and local authorities, administrative personnel from all departments, members of the Police, Civil Defence, Home Guards, SDRFs, school teachers, and NGOs.

The ATI shall function as a nodal training institute for disaster management in the state. The Centre for Disaster Management (CDM), a cell specially created in the ATI, has facilities to oversee and manage training related activities. CDM will have faculties consisting of a team of experts from various fields on DM who will develop a comprehensive training framework, design training modules and programs for disaster management. Adequate basic infrastructure for training should be made available. The training curriculum will be prepared annually and observed with the state/ district administration for regular and effective participants and functionaries.

The ATI would also take initiatives for identifying qualified, potential and experienced professionals on DM in the state. An empanelment of such resource persons will be done and will be made accessible to different departments. ATI would prepare a yearly training calendar on a series of Disaster Management trainings, which will be approved by the Relief Secretary, DM&R.

Apart from ATI, there will be other training institutions viz., state resource institutes (SRIs), engineering colleges, professional and technical institutes, industrial training institutes and NGOs/ departmental training institutes that will be roped in to scale up the training programmes for wider outreach.

Training Needs Assessment

Since the scope and area of Training Needs Assessment (TNA) is wide spread, there is an urgent need to undertake scientific assessment of training needs especially for Disaster Management in all departments. Such exercises will be undertaken periodically. TNA in the future will take cognizance of the need to develop competent, resourceful and responsible personnel and strengthen their capacity to work in any disaster situation.

As the disaster management component is new to many departments, it is necessary that departments carry out training needs assessments to identify the gaps in existing knowledge and skills on the subject, the scope for disaster management and the various trainings required to adhere to the provisions of the State Disaster Management Plan.

Each department would prepare a yearly schedule on training and other capacity building activities. A provision on Disaster Management training and refresher training for all staff would also be incorporated in the plans.

ATI would carry out training needs assessment for ULBs and PRIs to determine the training objectives for particular institutions and design the content and methodology of the training that caters to their needs.

ATI would carry out training needs assessment for special trainings for security forces, engineers, architects, city planners, first rescuers, etc.

SEC would identify and select personnel from various line departments like police, fire service, health, revenue, forest, etc. to form a core group of trainers.

Core Group

As mentioned above a core group of trainers would be formed and would be trained by the National Institute for Disaster Management (NIDM), police academies, paramilitary training centre of the NDRF, national training academy, etc. These trained groups would work as full time trainers for the state. Similarly, core groups at district levels would also be initiated.

Training of Trainers (TOTs)

Keeping in view the shortage of qualified and experienced personnel, the state would ensure that a pool of master trainers is developed so that these trainers reach out to the district and block levels to facilitate decentralized training.

The TOT programme would focus on topics like search and rescue, first aid, evacuation, fire fighting, safety and security, and emergency response. On completion of the training, the trainees would be certificated as Master Trainers who would train in the regional level trainings and workshops. These master trainers would be trained by the core group of trainers.

To start with, all departments of the state shall identify officers, support staff, and send a proposal to ATI for having them trained on the subject. The ATI shall plan to conduct TOTs programmes accordingly.

Training at District and Block Levels

The Master Trainers would train various stakeholders at the district and block levels. The various stakeholders to be trained are NGOs, community-based organizations (CBOs), social workers, youth organizations, National Cadet Corps (NCC), National Service Scheme (NSS), Nehru Yuvak Kendra Sangathan (NYKS), school teachers, and school children.

Training on Incident Response System would be conducted as per the guidelines of the National Disaster Management Authority (NDMA).

The District Disaster Management Authority would hold a quarterly meeting in which a separate agenda for training and other capacity building activities will be discussed and reviewed.

Trainings to be undertaken by various departments

Based on training needs assessment, all departments working as nodal agencies for disaster management would identify officers and support staff to participate in relevant trainings and chalk out yearly schedules of trainings. The departments

would also put in place a system of appraisal for meeting objectives of the trainings, review the content and methodology periodically, and suggest improvements thereof to ATI and other relevant training institutes. Some of the important subjects of trainings are given below:

i. Induction Training on Disaster Management

Basic Disaster Management training modules would be introduced into the induction and in service training of all relevant line departments such as police, fire service, health, revenue, forest, etc.

ii. Skill Building Trainings for Line Department Staff:

Selected staff from various departments would undergo skill building training on light search and rescue, first aid and fire.

iii. Training on Incident Response System

Training on Incident Response System would be conducted as per the guidelines of the National Disaster Management Authority (NDMA) for both state and district level officials.

iv. Minimum Standard for Emergency Relief and Response

The minimum standard for relief is prepared by NDMA. Training for all departments involved in post disaster relief, response and recovery phases would undergo these trainings in a phased manner.

v. Training on Equipment and Maintenance

First responders like the fire department, police department, SDRF, civil defence, etc. are provided with sufficient equipments which would require periodic maintenance. Some of these machines, tools and equipment might be new for these departments. Therefore, training on handling and maintenance of this equipment is to be given to the operators.

Special Trainings

Apart from departmental trainings, a series of special training programmes would be carried out by ATI for elected representatives, volunteers, first responders, and other training institutes and professionals. Some of the special trainings are listed below. These trainings will be focused on knowledge enhancement and skill building of individuals who will play a crucial role in the prevention, mitigation and preparedness aspects of disaster management.

i. Orientation on Disaster Management for State Authority, MPs, MLAs, district and local Authorities

A one-day orientation workshop on Disaster Management would be organised for State Authority, MPs, MLAs, district and local Authorities. The orientation would cover sessions on basics of disaster management, the need for disaster management, the progress the state has made in this direction, and the action plan.

ii. Trainings for ULBs:

Selected officials and representatives from the ULBs would undergo intensive training on development control regulations, fire safety regulations, construction bye laws and light search and rescue, and damage and needs assessment.

All government architects and engineers, especially in the ULBs and PRIs of the state, would undergo training programmes in earthquake-resistant design and construction, including repair and retrofitting.

Training for town and city planners would be given on seismic safety, flood plain zone regulations, land use planning in hazard prone areas, and environmental planning for fragile ecological areas.

iii. Trainings for PRIs:

PRI representatives would undergo training on community based disaster preparedness, relief and compensation entitlements, etc.

iv. Training for architects, engineers and masons on seismic resistant techniques

Practical and theory based training would be given to selected artisans involved in different trades including masons, bar benders, welders, carpenters, plumbers and electricians to ensure quality control in earthquake-resistant construction of all structures. A formal framework for the certification of artisans will be arrived at.

v. Training of paramedic and medical personnel for mass causality management

Necessary training/refresher training would be provided to medical officers, nurses, emergency medical technicians, paramedics, drivers of ambulances, and QRMTs/MFRs to handle disasters due to natural epidemics/BT.

It is important that medical and public health specialists should identify the epidemiological clues that differentiate a natural outbreak from an intentional one. In view of this, a structured BT related education and web-based training will be given for greater awareness and networking of knowledge so that they are able to detect early warning signs and report the same to the authorities, treat unusual illnesses, and undertake public health measures in time to contain an epidemic in its early stage.

Knowledge building through training for paramedical staff on CTD related subjects about the effects of chemicals, the treatment profiles for management of their toxicities, and antidotes to specific chemicals will be provided as per the requirement.

Doctors, paramedics, and nurses would be trained on emergency response subjects on Mass causality management, PSS counselling, trauma handling, first aid, and triage.

vi. Specialized trainings for First Responders (Civil Defence, Home Guard, SDRF, NSS, NYK and Community Based Task Force Teams)

They will be trained in Search and Rescue, Fire fighting, early warning and evacuation, communication, Emergency logistics, crowd control, safety, and security and early warning dissemination.

vii. Training for NGOs, Community Based Organizations (CBOs) and Self Help Groups (SHGs):

NGOs, CBOs and SHGs would be trained in subjects like Community Based Disaster Management, Participatory Vulnerability and Risk Analysis, PRA exercise, Search and Rescue, Fire fighting, early warning dissemination, evacuation, and task force roles and responsibilities

viii. Training for Housing Societies:

General awareness, fire safety, first aid and basic knowledge on risks and hazards will be given to selected housing societies.

ix. Orientation training to media personnel:

A one-day orientation on disaster management would be imparted to media personnel. They would be facilitated about the importance and significance of their role in disaster management.

x. Training on School safety:

School teachers, students, parents and other relevant stakeholders would be imparted training on school safety, child friendly space, Participatory Vulnerability and Risk Analysis, self rescue, first aid, fire evacuation, early warning dissemination, and school safety.

xi. Training at Religious places:

Temples, Shrines, Mosques, Churches, etc. Would be encouraged to prepare their DM plans and form task force teams to combat any disaster situation. These task force teams and representatives would be trained on crowd management/ control, search and rescue, safety and security and communication.

Hazard Specific Trainings

Some hazard specific trainings require a high level of skill and knowledge pertaining to risks involved at various stages of disasters. It is important that the State should build teams of highly skilled personnel to combat hazard specific threats with the help of national and international training institutes and experts.

Some of the trainings identified are as follows:

- *Search and rescue in confined areas (like collapsed buildings)*
- *Training on Response to Chemical, Biological, Radiological, and Nuclear (CBRN) disasters*
- *Industrial and oil fire disasters*
- *Accident handling on road, rail and air disasters*
- *Training on handling forest fires*
- *Training on combating terrorist activities*

Mock Drills and Simulation Exercises

Along with trainings, it is also important to check the level of preparedness through mock drills and simulations.

All schools, hospitals, important government buildings, cinema halls, sports clubs/ grounds and big corporate houses would conduct mock drills organized by professionals to identify the gaps in safety procedures and build their capacities to minimize loss of life. Police personnel, fire fighters, medical teams, paramedics, rescue teams, and special response teams (bomb disposal squads, ATS) would be involved in mock drills. All important public places, transport hubs, industries, and vital installations are appropriate for mock drills and simulation exercises. Private companies, industries and factories would have their onsite and offsite disaster management plans in place.

The district police department, Home guards, Civil Defence personnel, Fire Service officials, SRTs, etc. Would undergo periodic mock drills for different disasters, coordinated by the District Magistrate at the district level and by the Relief Commissioner at the State level. It is mandatory to have mock-drills at least twice in a year for fire and earthquake.

List of mock drills is as follows:

- *Plan for mock drills and disaster management at school level.*
- *Plan for mock drills on mass casualty management.*
- *Plan for mock drills on tourist places and religious places security procedures.*
- *Plan for mock drills on crowd and security in religious shrine, mosque, etc.*
- *Plan for mock drills at public places and buildings such as Railway station, Airports, Bus Depots, Cinema Hall, Malls, Markets, Tourist Places, Stadiums, Sports complexes, Auditoriums, Convention Centres, and Government Offices, etc.*
- *Mock drills to test effectiveness of EOC and communication channels*
- *Plan to check inter-agency coordination and compatibility.*

The SEC will lay due emphasis on the conduct of mock exercises and drills for different disasters. These exercises are essential for role clarity of the stakeholders concerned at the district level and for synergising coordination of various emergency support functions. In case of water and climate related hazards, exercises in different vulnerable areas of the state may be planned before the onset of the rainy season. For other kinds of disasters, exercises may be planned at regular intervals as considered appropriate.

Disaster Management in Curriculum

SDMA/SEC in collaboration with the Education Department and State Education Board, would ensure that the subject of disaster safety and disaster preparedness is introduced at the intermediate education level (Class XI and XII). Universities and autonomous institutes would introduce DM (which will include earthquake, flood management, etc) in various educational programmes including non-technical disciplines.

Industrial Training Institutes (ITIs), polytechnics and universities in the state would develop adequate technical expertise on various subjects related to DM.

DM related aspects of medical education (trauma care, epidemic control, emergency medical care by paramedics and emergency medical technicians, and telemedicine) shall be included in the curriculum at the undergraduate level, so that graduating doctors are able to handle emergencies with a better understanding of the issues involved

The table given below provides a list of academic, scientific and technical organizations in the state along with their function in Disaster Management. It also spells out the names and designation of the nodal persons in each organization:

Table 7-1: List of Educational and Technical Institutions working on Disaster Management in Rajasthan

SERIAL NO.	NAME AND CATEGORY OF THE ORGANIZATION			FUNCTION IN DISASTER MANAGEMENT			NODAL PERSON	
	ACADEMIC	SCIENTIFIC	TECHNICAL	EARLY WARNING	RECOVERY	CAPACITY BUILDING	NAME & ADDRESS	DESIGNATION
1	Centre for Disaster Management, Harish Chandra Mathur Rajasthan Institute of Public Administration			Promote prevention, response and preparedness skills and training to Civil Defence Wardens, NCC, Scouts & Guides, NSS, NYK, PRI	Liaison with the state government and assist it in disaster preparedness, rescue and relief strategies. Build a strong network with various stakeholders.	Impart training and organize workshop, seminars, conferences, etc. for all stakeholders of the Haryana state	Mr.Kartikeya Misra Centre for Disaster Management HCM Rajasthan State Institute of Public Administration Jawahar Lal Nehru Marg Jaipur, Rajasthan-302017 Phone No.:014	Nodal Officer and Officer in Charge (OID)

	members, NGOs etc. Develop strategic approaches for Risk and vulnerability reduction. Engage in research and documentation. Carry out Vulnerability Assessment projects.	including Government officials working in the field of disaster management. Undertake activities for public education and com	1-2651895 (R) Mobile 9414238197

					munity awareness.		
2		State Institute of Health and Family Welfare	Acts as a support body to the state NRHM by publishing various documents on role of epidemiology in disasters. Document and undertake resear	Asseses environmental exposures after a disaster event by documenting the nature and extent of injuries of the event, weighing sanitation options, hygien	Suggest and provide training programs.	Prof. Akhilesh Bhargava State Institute of Health and Family Welfare Jhalana Institutional Area, South of Doordarshan Kendra Jaipur-302004 Phone:-+91-141-2701938	Director, SIHFW

		ch on various health epidemics which arise in disaster situations. Monitor health trends in the state.	e, water supply etc. Also focuses on mental health i.e. psychosomatic disorders post disaster.			
3	Disaster Management and Relief Department, Gov	The nodal agency in the state for relief operations pre, during and post	Conducts various relief activities across the state. Publishes and issues notifications for	Awareness generation, publications of disaster management men	Dy. Secretary Disaster Management & Relief, Secretariat, Jaipur Tel. 91-0141-2227985	Deputy Secretary

	ernment of Rajasthan	In collaboration with other departments, funds various scientific and social researches related to various types of disasters. Provides funds for emergency operations	safety measures for prevention of road accidents etc.	t manual of the state specific to disasters like flood, drought, etc. Training programs for personnels.

		and also equipments to Police and other departments.			
4	Vardhaman Mahavir Open University	Impart training for rescue and rehabilitation operations.	Provides six months certificate course in Disaster Management Focuses on awareness gene	Professor Naresh Dadhich Rawatbhata Road Kota-324010 (Rajasthan) INDIA Phone: 2471254	Vice Chancellor

			ration, about adverse affects of natural calamities.			
5	Rajasthan Technical University		Includes Disaster Management as a course in B.Tech curriculum. Integrates Disa	Dr. Damodar Sharma Akelgarh Rawatbhata Road Kota Rajasthan, India Pin Code : 324010	Vice	Chancellor

				ster Man age men t with Engi neer ing conc epts. Also prov ides cour ses on seis mol ogy and eart hqu akes		
6.	Police	T ra in in g Sc h	Assist in rescue operati ons and help in rehabil	Intensive and skill ed train ing on disa	Commandant/ Addl. SP Kishangarh, Ajmer Distt. – 305 802 Phone:01463-	Command ant / Add l. SP

o ol		itation.	ster man age men t, pre and post reco very .	242008	

Awareness Generation

Communities are always the first responders to all disasters. Therefore, it is imperative to generate necessary awareness and knowledge about hazards/ disasters and their effects. Hence, communities should be made aware about the concepts of Disaster Management.

Strategies for awareness generation amongst the communities would be developed and adopted so that they help in developing a disciplined, structured, and panic-free approach for effective communication of any disastrous event and its immediate consequences.

The print and electronic media would play an important role for information dissemination. However, at the community level, different Information, Education and Communication (IEC) methods and tools shall be used.

Methods and Tools for Information Education and communication (IEC):

i. Development of jingles in local dialects
ii. Development of video spots
iii. Panel discussions on DRR in local televisions and radio
iv. Hoardings at Strategic locations
v. Display boards, Banners and/ or wall paintings in Panchayat Bhawans/ AWCs
vi. Observation on DRR day
vii. Development of posters, leaflets, pamphlets, notices etc.
viii. Folk media, street plays, Kalajathas on DRR
ix. Organising various competitions on DRR among students.

In order to approach the masses, awareness programmes viz.; workshops, exhibitions, campaigns, rallies, film shows, etc. shall be organized.

Civil Societies / NGOs can play a pivotal role in awareness generation of communities. Hence, there is an urgent need for identifying NGOs with a good track record for facilitating disaster management programmes/ activities in the communities.

Apart from awareness on general disaster management components, hazard specific awareness is also important. For example, in an area which has many chemical industries, communities should be made aware about the chemical agents, their basic hazardous effects and antidotes, remedial measures, and dos and don'ts.

Also, specially designed public awareness programmes would be developed for addressing the needs of physically handicapped and mentally challenged people, women, and the elderly.

Sufficient funds would be provided for awareness generation and information dissemination on Disaster Management in the state.

Community Based Disaster Management (CBDM) Programmes

Training and Education will not be conceived as a onetime effort. Rather, it will be planned as a continuous and scaled process which would reinforce and update skills of

communities on a regular basis. Such long term programmes at the community level would ensure community members take appropriate action for disaster risk management thereby ensuring a "culture of prevention" and creation of safer communities. The concept of risk reduction through community based disaster management will help in:

- Institutionalization of community based disaster risk management in policy, planning and implementation.
- Intensive work with the community for information dissemination and awareness generation
- Scaling of CBDM programme in the state.

Such programmes would enable community groups and other stakeholders including the government to identify potential risks and vulnerabilities, assess capacities, and plan for preparedness, prevention, and mitigation to overcome the ill effects of disasters through a coordinated effort.

SDMA would plan to implement CBDM programmes in which local communities would be supported in analyzing their hazardous conditions, and their vulnerabilities and capacities. To start with, the state government, with support from UNDP, is already implementing these programmes. SDMA would take Initiatives to scale up the programme.

Access to Disaster related tools and equipment

An effective response in the early phase of disasters is crucial for saving lives. Besides, skills and knowledge of responders, the effectiveness of search and rescue operations often depend on availability of appropriate tools and equipment (T&E) needed. Identifying appropriate tools, skill building of responders to use such T&E and timely access to such T&E prove crucial for any response operations. Hence, a plan for prepositioning of such tools and equipments and determining control of access is of paramount importance.

These T&E would be available to the first responders like fire services, police, civil defence, state disaster response forces, medical teams, etc., based on the requirements.

Any disaster has an absolute dependence on the specialized machinery and equipment for handling any such emergency/ situations Hence a successful operation of disaster management largely depends on the modern tools and equipment and their availability at all levels and at all sites.

A special training on handling and maintenance of tools and equipment will be designed for staff and operators.

The state would also plan to create a State Disaster Response Network (SDRN) - an online inventory designed as a decision making tool for the State Government administrators and crisis managers - to coordinate effective emergency response operations in the shortest possible time. Regular Updation of information will also be ensured.

The Emergency Operation Centre (EOC) would be strengthened by installing specialized machinery and equipment and manpower in the state and in all its districts. An inventory of tools and equipment should be made available in all EOCs and would be updated periodically.

SDMA would encourage all line departments to send proposals to DM&R Department, based on which provisions for procurement and purchase of assets will be done.

Documentation of Best Practices

The State has set up websites and portals to disseminate disaster related information to all stakeholder groups. All relevant information, plans, etc. are made available to all stakeholders. The state would make efforts to prepare films, manuals and other documents targeting various stakeholders to inculcate a culture of prevention.

Apart from the above mentioned initiatives all departments would collect informations/ documents of various past incidents of disaster. Paper cuttings of such incidents, articles, and news would be collated to be used as ready references. Departments would also document best practices of success stories and share it with others through websites, manuals, or any publications.

Chapter 8 - Relief and Response

All disasters, emergencies and crisis events are chaotic and highly dynamic, creating physical, emotional, and social disorders.

"Response measures are those which are taken immediately during and following the disaster. Such measures are directed towards saving lives, alleviating sufferings, protecting property and dealing with the immediate damage caused by the disaster."

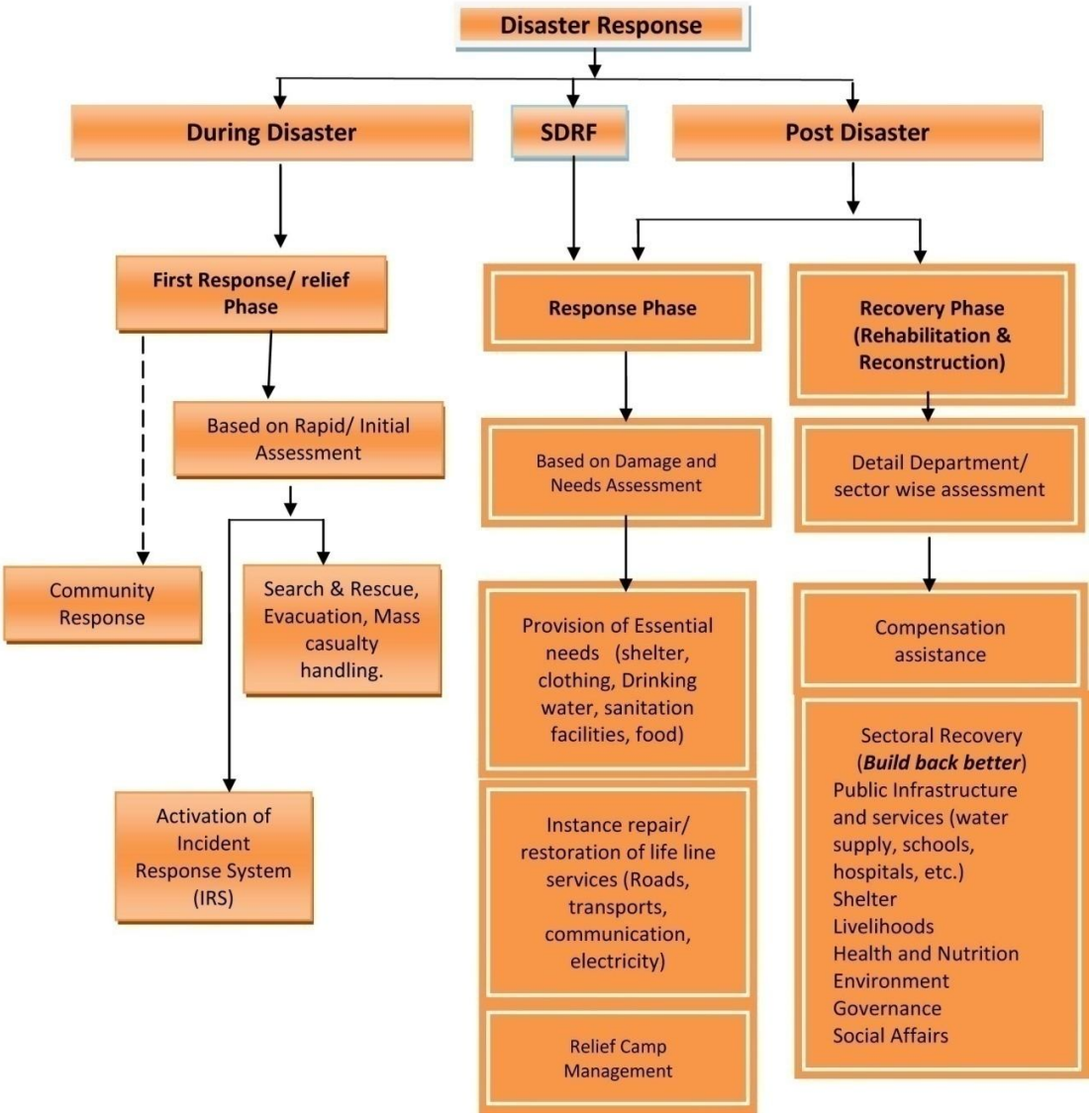

Figure 8-1: Schematic representation of response and recovery structure

Response operations usually have to be carried out under disruptive and sometimes traumatic conditions. Often, they are difficult to implement and they tend to make heavy demands on personnel, equipment, and other resources. Thus, without sound

planning, organization and training, and a dedicated response team, operations are unlikely to achieve optimum success.

From the above schematic diagram, response can be classified into the following three phases:

During Disaster	First response/ Relief Phase
Post Disaster	Response Phase
	Recovery Phase

During Disaster

'During Disaster' phase starts with the early warning sign put on and declines when the early warning sign is put off. It is in this phase that the community experiences the full effects of the incident. During disaster phase, the "response" structure can be made operational for the state up to the district level.

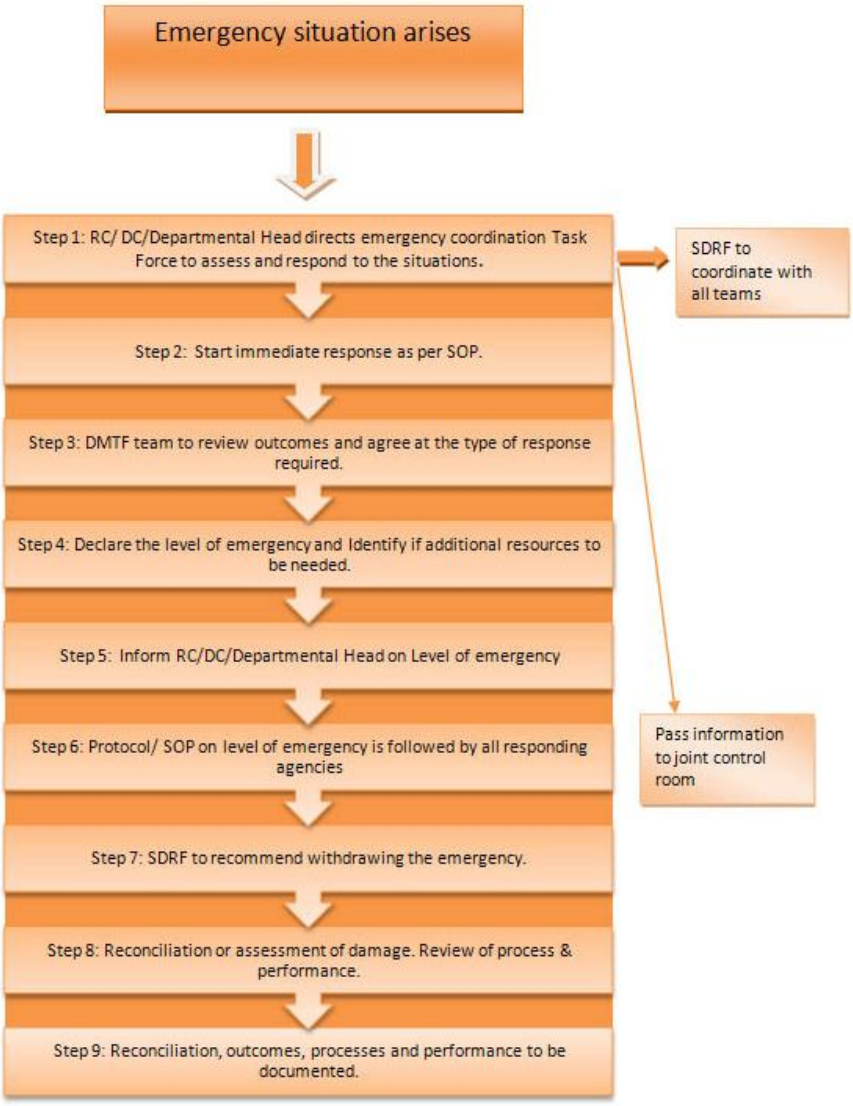

Figure 8-2: Flow Chart of Events for Major Emergency Response

Communities as First Responders

Whenever disaster strikes at any part of the world it is the community that suffers the maximum; be it in a natural disaster like flood or earthquake, or a manmade disaster like a terror attack. The loss is severe is terms of life, property and psycho-social trauma. In such situations, undoubtedly the community always emerges as the first responder to help its own members in distress till external help arrives. To ensure the community is better equipped in coping with the type of disaster it is normally prone to, Community based approaches as in terms of preparedness in disaster risk reduction must be adopted as a pre-disaster mechanism. Normally, it is seen that external help takes between 12 to 48 hours (sometimes considerably more) to arrive and set up operations at a disaster site. Therefore, during this

critical period the community needs to act fast to ensure minimum loss of life and property so that the recovery process is also faster.

Government First Responders

The basic responsibility for undertaking rescue, relief and recovery measures in the event of natural disasters lies with the State Government.

The responsibility for response instantaneously will rest with the Gram Panchayat, Block or Municipality. If the requirement of resources for responding to an emergency exceeds, the local availability, then the support will be sought in the following order:

- District
- State
- Centre & other States, International Agencies

The involvement of stakeholders will also be sought while ensuring a coordinated approach at all levels between government and non-government agencies for emergency response.

Simultaneously certain departments which are the First Responders in all disasters like Police, PWD, Engineering department, Fire department, SDRF, health department – medical ambulance services (108 services) are also responsible to reach the incident area for support. The personnel from these departments are well trained in life saving techniques, first aid, search and rescue, and evacuation of affected victims to safer places.

Effective response to the impact of disaster is critical, mainly in order to:

- Limit casualties
- Alleviate hardship and suffering
- Restore essential life support and community systems
- Mitigate further loss and damages
- Provide the foundation for subsequent recovery

Response operations may get adversely affected if the support from the above mentioned departments gets delayed is inadequate or inappropriate. This situation can arise if effective prior coordination arrangements have not been catered by the relevant departments. Therefore effective preparedness measures will be taken to ensure better and quick response.

The role and importance of the community, under the leadership of the local authorities, PRIs and ULBs, being the bedrock of the process of disaster response, is well recognised. For their immediate support, there are other important first responders like the Police, SDRF, Fire and Medical Services. The state will take efforts in reducing the time lag of these forces to respond to the situation in the shortest possible time in disaster affected areas. Other important responders like the Civil Defence, Home Guards and youth organisations such as NCC, NSS and NYKS will also be coordinated in emergency relief operations.

The deployment of the Armed Forces would also be organised when required. Establishment of SDRF would progressively reduce deployment of the Armed Forces. However, the Armed Forces would be deployed only when the situation is beyond the coping capacity of the State Government.

Therefore, all these departments would draft their own response plans. The response plans would be based on the following premises:

a. *More delegation of power to lower level government functionaries and elected representatives of the PRIs. They will be the principal coordinators of emergency response for local emergencies.*
b. *Village or ward to be the unit of planning.*
c. *In the rural areas, Gram panchayat will be the lowest level of co-ordination and management.*
d. *Devolution of financial power to the lower level functionaries for management of emergencies and increase in the ceiling of expenses they can incur during emergencies of serious nature and where communication with the district and state headquarters have been cut off.*
e. *Focus would be on capacity building of local personnel in search and rescue, evacuation, first aid, emergent relief and shelter management, and equipping them with necessary equipment and other resources with a conscious endeavour to progressively reduce external dependence during emergencies.*
f. *Minimizing divergent and overlapping roles of officers during emergencies to ensure unified command and effective co-ordination, which demands establishing and activating the Incident Response System (IRS) during large scale emergency/ disaster situations.*

As mentioned above, it is only when the resources required to respond to an emergency exceeds the local availability, that support will be sought from the district and State. A well worked out State HR Plan would help towards better capacity building and preparedness of the various departments in the state government. However, when the magnitude and severity of the emergency is high then the state and district will activate the Incident Response System.

Activation of the Incident Response System (IRS)

It is to be noted that there is already a command structure that exists in the administrative hierarchy to respond to disasters. This might not be foolproof and systematic yet with this existing setup, the situation is managed to a certain extent. The current administrative setup to manage disasters needs to be strengthened and professionalized by drawing upon the principles of the IRS with suitable modifications.

Incident Response System (IRS)

The ICS is essentially a management system to organize various emergency functions in a standardized manner while responding to any disaster. It would provide for specialist incident management teams with an incident commander and officers trained in different aspects of incident management, such as logistics, operations,

planning, safety, media management, etc. It also aims to put in place such teams in each district by imparting training in different facets of incident management to district-level functionaries. The emphasis would be on the use of technologies and contemporary systems of planning and execution with connectivity to the joint operations room at all levels.

Incident Response Team (IRT)

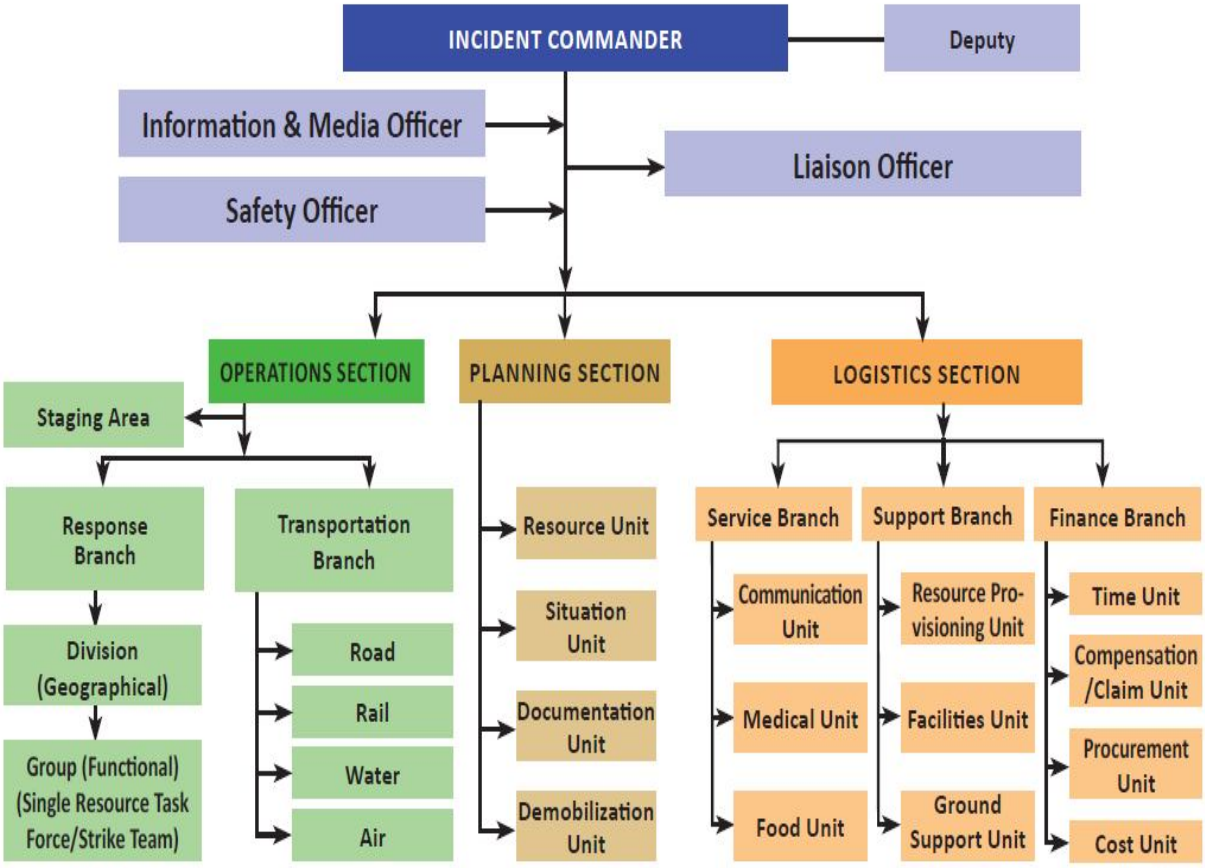

Figure 8-3: Incident Response Team (IRT) Framework

IRS establishes the following four major functional areas for managing an incident (Figure 8-3):

Command Staff – Provides leadership and establishes incident objectives and has overall responsibility for managing the incident;

Operations – Develops and oversees tactical operational activities needed to accomplish incident objectives;

Planning – Coordinates planning, resource orders and release, maintenance of records, mapping, technical expertise, and documentation necessary to accomplish objectives

Logistics – Oversees the development and use of infrastructures (facilities, transportation, supplies, communication, food, etc.) to support responders as they work towards accomplishing incident objectives.

The command staff would be responsible for deciding as to which section, branch, division, groups, units of the IRT is to be activated.

The IRS provides accurate information, strict accountability, planning, leadership, and cost effective operations and logistical support for any incident.

Key factors to be considered for first response and relief measures during an emergency, crisis situation or disaster

Readiness of Resource Organizations

The readiness of resource organizations (both government and non-government) to respond to emergencies, crisis and disasters, often at very short notice, is a very important requirement for response operations. Sometimes, failure on the part of only one designated organization may seriously upset the total response effort. However, disaster management authorities do need to bear in mind that the response lead-time for resource organizations can differ markedly. Response management needs to take into account and harmonize differences in organizational lead-times if a balanced response is to be achieved.

Response departments and agencies should aim at reducing the response lead-time so that timely response is executed saving large number of people, properties and livestock.

Warning

This section is dealt with in detail in the preparedness chapter. However, mentioning it here is intentional, in order to avoid the need for undue cross-referencing, especially under impending operational circumstances.

As has been emphasized, an effective system of warning is vitally important for successful response operations even though there are bound to be some occasions when little or no warning will be available. The main needs for warning are:

- *Initial detection, as early as possible, of the likelihood that a disaster would occur.*
- *Origination of duly processed warning as early as possible.*
- *Effective means of transmitting warnings; establishment of ICT*

Evacuation

Evacuation of human population and livestock is the only prescribed means to save them from the fury of disasters. Evacuation of communities can be one of the most difficult response operations, especially, when it is a precautionary measure based on warning indicators, prior to impact, in order to protect persons from the full effects of disasters.

Evacuation may also be necessary after the area has been affected (Post impact) by disasters in order to move persons from disaster-stricken areas into safer, better surroundings and conditions

For carrying out successful evacuation, the threat perception on the part of DM officials is essential. Continuous dialogue with stakeholders such as, early warning providers, transportation authorities, health-care authorities/ personnel, food and essential commodity suppliers, civil societies, NGOs and last but not the least, the communities is essential.

A Decision Support System (DSS) and inputs based on Geographical Information System (GIS) platform are essential for carrying out successful evacuation. Responsibilities of each organisation need to be fixed beforehand in the form of SOPs.

Activation of the Response System

For rapid and effective response, there needs to be a system for activating disaster management officials and resource organizations. Therefore, an Incident Response System would be established in the following lines by the Government of Rajasthan.

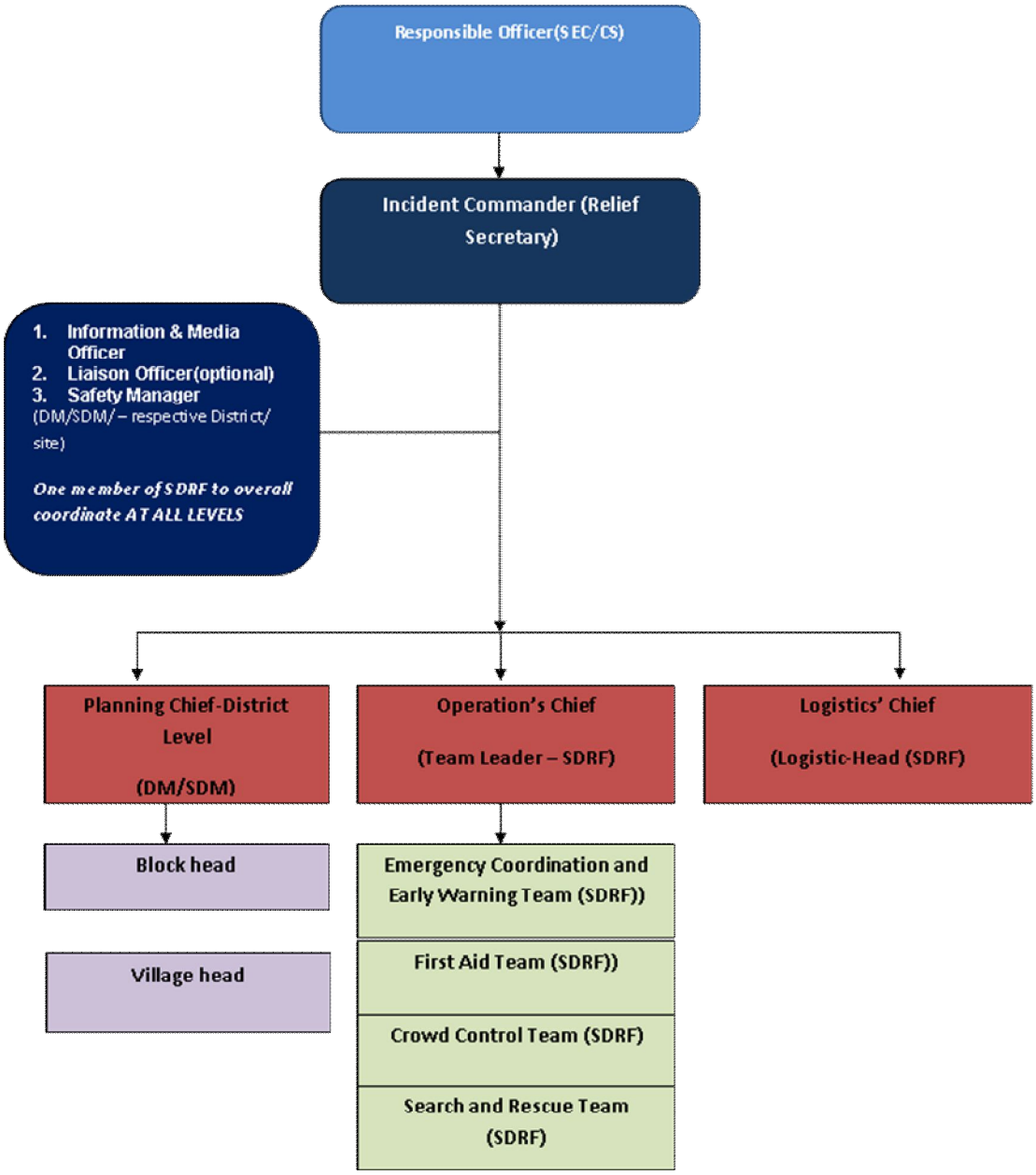

Figure 8-4: Schematic diagram of Incident Response System

The state would depute its officers to undertake necessary training in IRS in a phased manner. The State DM&R Department would also prepare and finalize the Standard Operating Procedure (SOPs) required for putting the IRS in place.

Co-ordination of Response Operations

Co-ordination of the actions during operations is very important. Good co-ordination ensures optimum utilization of resources, therefore avoiding gaps or duplication in operational tasks. Hence, the need for an Incident Response System. Appropriate

Emergency Operations Centres (EOCs) are essential for achieving effective management and error less decision making.

Coordination, between and amongst the various agencies involved in DM and ensuring implementation of the tasks entrusted to them is an important statutory responsibility of authorities at various levels. Coordination of efforts amongst various government departments and other stakeholders generates synergy and involves the bringing together of agencies and functionaries to ensure effective performance.

Mass Casualty Management

[30]Mass casualty incident (MCI) is defined as an incident which generates more patients at one time than locally available resources can manage using routine procedures. It requires exceptional emergency arrangements and additional or extraordinary assistance. Whereas mass casualty management (MCM) is defined as a coherent and interrelated set of established procedures, policies, and plans that contribute to the shared objectives of optimizing the baseline capacity to deal with patient populations expected in a mass casualty incident, and efficiently increasing this capacity during the response to a mass casualty incident.

Mass casualty incidents can result from natural disasters like earthquake, flood and manmade disasters such as road accidents, aircraft, shipping, stampede, chemical spills, factory fires nuclear radiations, bomb explosion, terrorist activities; or even food poisoning, vector borne, outbreaks of disease etc.

As mentioned above, managing mass casualty needs extraordinary effort and hence coordination between various responding agencies and command systems play a crucial role besides the preparedness for any eventuality. A sequential step for MCM is given in Figure 8-5

[30] *Mass casualty management systems : strategies and guidelines for building health sector capacity., WHO*

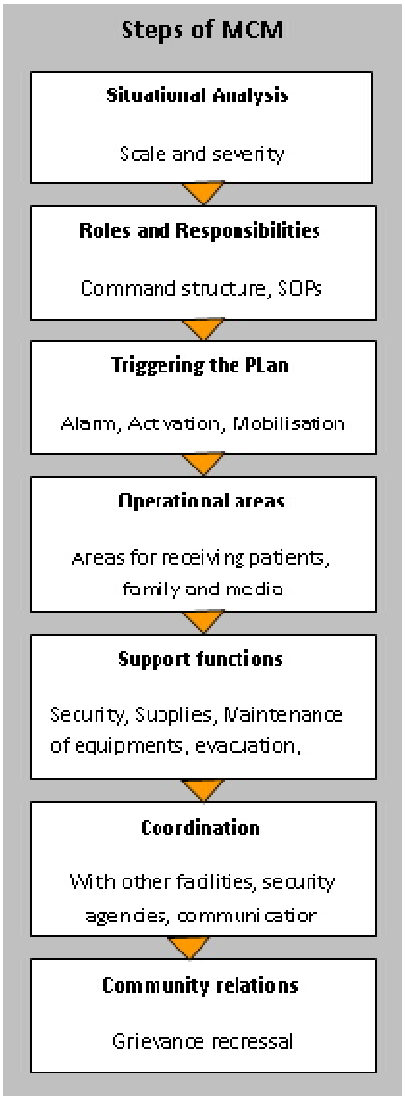

Figure 8-5: Steps of MCM

Important functions during MCI are:

1. A joint group of medical professionals and security agencies will assess the situation for determining the scale of operation and pooling in resources
2. In case of MCI, a command structure will be established to coordinate and manage the response.
3. Mobilisation of resources (human, supplies and equipments) shall be carried out. Special alarm systems can be installed at major facilities centres for instant mobilization.
4. If required, special areas would be designated for receiving patients, family members and media for smooth conduct of operation.
5. Special groups shall look after security arrangements, pharmacy and blood supplies and maintenance of critical equipments. If required, evacuation and relocation of patients and psychosocial support for patients, families and staff shall also be taken care of these groups.

6. Coordination among various facilities and responding agencies shall be of paramount importance. Communication between various stakeholders shall be ensured for better coordination
7. In an event of MCI, it is essential that right information and appropriate facilitation is offered to the public. A grievance redressal cell can be set up at the facility for families and friends of victims to help them identify, locate and address their needs.

SEC with the health department would ensure that the following steps are taken on MCM operations before the event:

- *Identify major health facilities in all districts and chalk out plans with district administration to equip it for MCM.*
- *Shall support all districts to develop capacity building on MCM with cooperation of various public and private health facilities, security agencies and others*
- *SOPs for all possible hazards should be ready beforehand and shared with all major health facilities in the state.*
- *Shall ensure that all major district hospitals have resources to handle MCM*
- *Determine lines of authority and roles and responsibilities of emergency and health officials*
- *Undertake regular assessments and evaluations of the preparedness at hospitals. Mock drills and simulations shall be carried out to gauge preparedness, identify gaps in coordination and assess needs for capacity building*

Rapid Damage Assessment (RDA)

Immediately after the disaster, there is an urgent need for rapid damage assessment in terms of loss of life, injury, and loss of property. The objectives of damage assessment are to mobilize resources for better rescue and relief, to have detailed information of damage extent and the severity of the disaster, and to develop strategies for reconstruction and restoration facilities.

Rapid Damage Assessment will emphasize on a rapid appraisal of the situation and extent of damage to provide resources for effective relief and rescue. Rapid Damage Assessment (RDA) would be conducted at the local level where the disaster has occurred. The RDA team will be headed by the local Incident Commander and will comprise of the Patwari, CMO of the Sub-division Hospital, Junior Engineer PWD, and some prominent local persons may be involved at the discretion of the local Incident Commander. The RDA team will report its assessment of the damage to the District Collector. The RDA would be conducted according to a proforma/ format developed by the State Disaster Management Authority.

Levels of Response

The rapid assessment would help in declaring the level of emergency (L) based on which the nature of response is decided.

L0 level denotes normal times which would be utilized for close monitoring, documentation, prevention and preparatory activities. Training on search and rescue, rehearsals, evaluation and inventory updation for response activities will be carried out during this time.

L1 level (Concern) specifies a disaster that can be managed at the district level. However, the State and Centre will remain in readiness to provide assistance, if needed.

L2 level (Distress) disaster situations are those, which require assistance and active participation of the State in the form of mobilization of its Resources for management of disasters.

L3 level (Crisis) disaster situation is a large scale disaster where the State and District authorities have been overwhelmed and require assistance from the Central Government for reinstating the State and District machinery as well as for rescue, relief, and other response and recovery measures. In most cases, the scale and intensity of the disaster as determined by the concerned technical agency like IMD are sufficient for the declaration of L3 disaster.

The SOPs for determining the levels of disasters and for issuing alerts to electronic messaging systems of various agencies about disasters have been formulated by MHA. These SOPs will be reviewed periodically for disaster response management in case of natural and man-made disasters.

Communications

All aspects of disaster management, good communications are essential for effective response. Also, since communications may be adversely affected by disaster impact, reserve communications (with their own power supplies) are a necessary part of response arrangements. The value of solar-powered communications, use of VHF and Satellite phones especially under severe critical conditions, should be considered.

Public Co-operation

Good co-operation between the disaster response authorities and the public is essential if response operations are to be successful. The foundation of such co-operation should, of course, be laid during the public awareness programs that are a necessary part of preparedness. However, disaster response and coordinating authorities should remember that the affected public needs to be kept informed. This particularly applies to intended response action and the timing of relief supplies.

Post Disaster – Response Phase

As mentioned, the post disaster situation has two different phases viz., the Response and Recovery phases. Response is defined as "the provision of emergency services and public assistance during or immediately after a disaster in order to save lives,

reduce health impacts, ensure public safety, and meet the basic subsistence needs of the people affected"[31].

It is during this phase that the affected victims (those that are rescued, evacuated and are taken to safer places) are given basic essential facilities. Also, the lifeline services that are damaged due to disasters are repaired and restored.

However, in case of major and prolonged emergencies, the relief activity will still be continued.

Key factors to be considered for Effective Response in a post disaster Situation

Experience has shown that effective response depends fundamentally on two factors:

- Information
- Resources

Without these two vital components, the best plans, management arrangements and expert staff would become difficult to operationalise. Bearing this fundamental premise in mind, the major requirements for effective response are summarized below:

Emergency Support Function (ESF)

The Emergency Support Functions (ESF), comprising of various support agencies, will manage, coordinate and support the primary agencies with specific kinds of assistance, which are common to all types of disasters. The ESFs forms an integral part of EOC.

The proposed ESFs would identify requirements, mobilize and deploy resources to the affected areas and assist the districts in their response actions. The ESFs would come into operation only on either receipt of warning of an expected calamity or in the event of a sudden emergency.

The ESF would coordinate directly with their functional counterparts at the district level (L2) and also with central government agencies or ministries (L2 and L3). The only situations where the State government will contact the central government for L2 level emergencies will be for situations/ emergencies with no past experience (e.g. earthquake) or in situations where the experience and expertise available are inadequate (for example, a terrorist attack using weapons of mass destruction).

The response plans would be based upon the level of disaster and SOPs would be available with all emergency support functions in accordance with the level of disaster and shall be clearly mentioned in the District DM Plan.

Camp Management

Camps are a temporary provision of protection and assistance to displaced populations, forced to flee their homes due to disaster.

The SEC and district administration would ensure all important functions of camp management as described below:

[31] *UNISDR*

Security and Dignity:

In an emergency and disaster situation there are diverse groups of inhabitants in a single camp for which both internal and external security is of paramount importance for preserving and respecting the dignity of all individuals - one of the key pillars of camp management. This can be in terms of socio-cultural values, customs, physical, and psychosocial needs.

Registration and population:

Developing a retrievable database of all camp inhabitants with some of the important demographic details including registration of entry and exit is a basic tenet of a camp management. However, sensitive information would be kept confidential.

Information dissemination:

Inflow and outflow of essential information about the prevailing situation, health conditions, population and other aspects would be streamlined.

Coordination and management*:*

Camp management requires a high degree of coordination between multiple agencies. Any lapse in coordination can result into chaos, violence or disruption of essential services. The role of the camp manager is, therefore, crucial.

Mobilisation and participation*:*

All activities in the camp should be carried out in the most participative possible way. Designating volunteers and managers within the camp may be useful for better coordination and mobilisation.

Shelter planning and environment concerns*:*

Planning of shelters is one of the crucial aspects of camp management. It should be done considering the expected population, access to basic amenities and services, access to entry and exit gates, security and most importantly the environment and natural resources of the site. Environmental concerns are a feature of every camp and need to be taken into account from the moment a site is selected and till it has been responsibly closed. Soil erosion and the loss of natural vegetation cover are some of the most common and visible environmental impacts. Others, such as ground water pollution and soil contamination might be less visible but are equally important. Management of the environment within and around the camp should be coordinated with the host community. An environmental management plan made together with camp residents/committees (or, where available, village-based environmental groups), can identify the priority areas to be addressed.

Basic services:

Provision of services such as water, sanitation, hygiene and waste management are basics of good camp management. Specialist agencies and teams can be involved in this task. Equity and participation of camp inhabitants would be taken care of.

Transitional education:

When a camp is expected to be operational from more than three months, educational facilities should be provided for children living in the camp by engaging local teachers and youth, specialist agencies and experts.

Health facilities:

Maintaining health and hygiene is one of the most important functions of camp management. Surveillance of seasonal and chronic diseases of the area, and water borne and vector borne diseases should be delegated to a special group of health professionals. The camp should have medical and healthcare facilities, which are accessible to all. Special vaccination drives and disinfection drives would be taken up periodically. Participation of camp inhabitants for maintaining a hygienic environment in the camp should be ensured.

Special needs groups:

The camp manager would ensure special health facilities for the needs of special groups such as pregnant women, the chronically ill, disabled, infants, aged, people living with HIV AIDS (PLWHA), orphans etc.

Minimum Standard:

Minimum standards to disaster response would be ensured as it ensures quality and accountability in response. There are national standards which the respective departments can adhere to while responding to emergencies. The Sphere Disaster Response Minimum Standards is developed by INGOs, NGOs that have been/ are being adapted by many countries worldwide.

Using school buildings as temporary relief camps during disasters disrupts the education of children for long periods. Alternative arrangements for housing relief camps will be put in place through various mitigation projects to gradually reduce dependence on the buildings of educational institutions.

Damage and Needs Assessment

Detailed Damage Assessment would be done at the district level during the recovery stage involving skilled personnel. The aim of this assessment is to estimate the economical and financial aspects of damage, the detailed building, agricultural, and property damages and also to propose retrofitting or strengthening. The DDA team would be headed by the District Collector and will comprise of the District Relief Officer, Executive Engineer PWD, Chief Medical Officer of the affected district, members of prominent NGOs working in the district and any other experts at the discretion of the District Collector. The DDA team would also have two external observers from the State Disaster Management Authority and DMC Cell of the State ATI respectively. The team would assess the damage on the basis of the format developed in advance by the State Disaster Management Authority in consultation with the DMC Cell of the State ATI and eminent experts in the field.

Chapter 9 - Recovery and Reconstruction

Recovery and reconstruction (R&R) or comprehensive rehabilitation is the last step in the cycle of disaster management. This is the phase of a new cycle, where the opportunity for reconstruction and rehabilitation should be utilised for building a better, safer, and more resilient society. Thus, the approach to the reconstruction process has to be comprehensive so as to convert adversity into opportunity. Incorporating disaster resilient features to 'build back better' will be the guiding principle. This phase requires the most patient and painstaking effort by all concerned. The administration, the stakeholders and the communities need to stay focused on the needs of this phase, as, with the passage of time, the sense of urgency gets diluted. The appropriate choice of technology and project impact assessment needs to be carried out to establish that the projects contemplated do not create any side effects on the physical, socio-cultural or economic environments of the communities in the affected areas or in their neighbourhood.

The recovery process starts immediately after the event of disaster and it is integrated with the post disaster phases of relief, response and rehabilitation. There can be short term and long term measures of the recovery process. The sectors that need attention for recovery are as follows:

Emphasis would be laid on plugging the gaps in the social and economic infrastructure and infirmities in the backward and forward linkages. Efforts will be made to support and enhance the viability of livelihood systems, education, health care facilities, care of the elderly, women and children, etc. Other aspects warranting attention will be roads, housing, drinking water sources, provision for sanitary facilities, availability of credit, supply of agricultural inputs, up gradation of technologies in the on-farm and off-farm activities, storage, processing, marketing, etc.

Housing

This involves design, planning and reconstruction of all affected houses and shelter structures in urban and rural areas. Though the process of planning in both these areas may be different, the basic tenets of reconstruction do not change. The damage assessments (RDA/ DDA), which are done by the state in the aftermath of a disaster, decide the extent of damage and also the magnitude of capacity required to cope up, based on which transitional (temporary or semi permanent) structures are built for immediate rehabilitation of the affected people. This also involves categorising the housing buildings into various categories to determine the compensation package and declare it safe or unsafe for further use.

Choosing appropriate site, material of construction and technology for mass housing is of paramount importance to ensure utility and functionality. A participatory process may be adopted for design of shelters to ensure acceptance by the community. Recent experiences of Gujarat, Bihar and Kashmir have shown that an owner-driven reconstruction (ODR) approach suits the community. Reconstruction plans and designing of houses need to be a participatory process involving the government,

affected community, NGOs and the corporate sector. Reconstruction programmes should be within the confines and the qualitative specifications lay down by the Government.

However, the long term reconstruction process for permanent houses, essential services, and social infrastructure should also be taken up in the shortest possible time. For permanent reconstruction, ideally, the work including the construction of houses must be completed within two to three years. The State Government would create dedicated project teams to speed up the reconstruction process.

Basic Amenities

Basic services such as water supply, sanitation, sewerage, solid waste management, waste water disposal etc. should be restored in the shortest possible time. Alternate arrangements of water supply and temporary sanitation facilities can be sought with the help of special agencies, NGOs, and CBOs. Special arrangements for provision of basic services would be ensured. It can include creating temporary infrastructure for storage and distribution of water supply, running tankers, temporary designated areas for waste management, and sanitation facilities. Special care would be taken for the vulnerable sections of society, remote location habitats and special needs groups so that they are not left behind for entitlements and the rehabilitation process.

In the long term, plans would be prepared for upgradation and expansion of infrastructure for basic services in consultation with local communities. Also, it has to be ensured that these facilities are strong enough to withstand the future disasters.

Critical Infrastructure

Restoration of lifeline infrastructure such as power, telecommunications, and transport is of paramount importance, as response and relief activities are totally dependent on these services. Planning and design of the damaged infrastructures should be done considering the safety aspects and with a 'do not harm' approach.

Often, social order also lies in how quickly and effectively life line services and infrastructure are restored. Failing which may lead to chaos, public outrage, riots, forced migration, and other social distress. Some of the strategies for restoring the physical infrastructure and lifeline services are as follows:

Build Back Better: Destruction is always an opportunity to build a more resilient and stronger infrastructure. Thus, the recovery process would always adopt the approach of Build Back Better. This also ensures greater resilience and preparedness and minimum loss in the event of a future disaster.

Master Plan: The recovery process would take into consideration the broad regional planning and should not be focused only on local area development because the recovery process will also affect the livelihood and employment patterns of neighbouring areas.

Participatory Planning: Infrastructure improvement measures need to be balanced with, or at least be in line with, the social and cultural needs and preferences of beneficiaries.

Prioritised and phased development: Long term development plans always have prioritised packages of work which will consider the vulnerability and critical issues of some services in the affected areas. Also, a phased development helps rectify and avoid the mistakes made in the early stages of recovery.

Coordination: A master plan of development will help better coordination between various development agencies. Participation of private players and CSOs is advisable to expedite planning and implementation in a participative manner.

Health and Education

Experiences from disasters have shown that there is extensive damage to the health and education infrastructure during disasters. To make schools, colleges, universities, health care centres, hospitals, and clinics safe from hazards, it is essential to evolve an institutional mechanism whereby the risk assessment and risk reduction measures are planned, executed, and monitored to limit the damages to infrastructure and loss of lives during disasters. Also, construction of new health and educational facilities should be done considering the risks posed by the hazard in the area.

Using school buildings as temporary relief camps during disasters disrupts the education of children for long periods. Alternative arrangements for housing relief camps will be put in place through various mitigation projects to gradually reduce dependency on the buildings of educational institutions.

Livelihood Restoration

A livelihood comprises the capabilities, assets (including both material and social resources) and activities required for all means of living. A livelihood is sustainable when it can cope with and recover from stress and shocks and still maintain its capabilities and assets both now and in the future.

State governments would have to lay emphasis on the restoration of permanent livelihood of those affected by disasters and pay special attention to the needs of women headed households, artisans, farmers and people belonging to marginalised and vulnerable sections. Some of the strategies for livelihood restoration are as follows:

Expanding livelihood opportunities: In the aftermath of a disaster, there is always a demand for generating immediate employment opportunities to stabilise the loss of income and livelihoods of affected families. Cash for work, engaging affected population in debris clearance and waste management, and other activities can help generate immediate employment opportunities. However, restoring the livelihoods in the affected region demands a more balanced approach considering prevailing livelihood patterns, environment, natural resources, skills, and socio cultural limitations of the society. The government can take up measures to attract investments in the region by considering tax vacations, rebates and special incentives for industries to generate long term employment opportunities.

Strengthening existing livelihood patterns: Strengthening existing livelihood patterns by better market linkages, technological support and other means can be considered.

Environmentally sustainable livelihoods: Environmental and ecological considerations would not be neglected in the process of generating employment opportunities.

State governments would lay emphasis on the restoration of permanent livelihoods of those affected by disasters and pay special attention to the needs of women headed households, artisans, farmers and people belonging to marginalised and vulnerable sections will be given.

Finance Infrastructure

Institutions like banks, post offices, government treasuries, income tax offices, etc., are also vulnerable to disasters. Small banks without any safeguards in rural areas are particularly vulnerable to disasters. The loss of data, currency, and documents from these institutions can damage the social and financial security of people. To safeguard these important establishments from disasters, they should have robust backup systems besides structural and non structural safety of assets. The recovery process should also consider expansion of financial services such as micro credits, soft loans etc. for speedy rehabilitation. Promotion of insurance and reinsurance through partnership with public and private agencies should also be considered for comprehensive risk reduction within the recovery framework.

Environment and Ecology

The recovery process often tends to overlook environmental and ecological effects in the aftermath of disaster, further aggravating the situation by adopting an unsustainable recover process. Mass housing projects, infrastructure development and other activities of recovery can adversely affect the natural ecosystems, natural resources and environment. Hence it is essential to take a critical look with reference to ecology and environment for all recovery activity.

Debris clearance: In the aftermath of a major catastrophe, debris clearance is a major activity. Debris created due to a disaster includes waste soils and sediments, vegetation (trees, limbs, shrubs), municipal solid waste (common household garbage, personal belongings), construction and demolition debris (building and their contents), vehicles (cars, trucks), and white goods (refrigerators, freezers, air conditioners). Often, vast amount of waste not only impedes access to affected areas but can propagate dangerous infectious diseases

Moreover, damage to industrial facilities, refineries, and sewer systems can trigger secondary hazards, exposing the environment and survivors to toxic and flammable materials that may or may not be immediately discovered. In the face of such an immense task, waste management facilities, if they exist, are often quickly overwhelmed.

Environment Impact Assessments: Conducive legal provisions and effective enforcement of environmental laws should be in place for a sustainable recovery process. All medium and large reconstruction and development projects should undergo

environment impact assessment by competent agencies and should be approved by a competent authority. Enforcement of all regulations that limit damage to environment should be adhered to strictly.

Environment friendly material and technologies: As reconstruction is a major component of the recovery process, the selection of materials and technology plays an important role in determining the environmental effects of the reconstruction process after major disasters. The reconstruction process can put tremendous stress on local resources and ecosystem and if left unregulated, can lead to even more catastrophic effects on local environment, natural resources and livelihoods in the medium to long term. Similarly, restoration of livelihood should also consider environmental factors, so that in an effort to provide employment opportunities rapidly, done does not oversee the larger picture affecting the environment and eco systems.

Restoring ecosystems: Where ecosystems have incurred severe damage, a multi-sectoral management approach is important to ensure that the links between various livelihood and environmental aspects are recognized and addressed.

Integrated management of ecosystems: Integrated management approaches have been employed most notably in the management of watersheds, forests, river basins, and dry and wet lands and have increasingly focused on climate change adaptation and disaster risk reduction. An essential component of these approaches is the creation of sustainable livelihood options.

Sustainable Tourism:

As Rajasthan is one of the most preferred destinations for domestic and international tourists, developing productive and sustainable tourism is of paramount importance. This requires balancing the economic benefits with the often heavy environmental impacts caused by tourism development.

Governance

Governance is an important issue that needs to be addressed through a multi-sector and multi-stakeholder approach in pursuing the management of disasters. There is, therefore, a need to recognize and address:

- *Participation of stakeholders in all aspects of decision-making related to the mitigation, relief and rehabilitation of victims of disasters.*
- *There are gaps and duplications while responding to disasters. Therefore, there is a need for enhanced coherence, consistency and cooperation to ensure an efficient and effective use of available resources at the district, state and national levels.*
- *The mechanisms to deal with the social and economic impacts on human health, society, and the environment, including liability, compensation and redress needs to be streamlined and strengthened*

Chapter 10 - Funding Arrangement

Existing funding arrangement

The policy and funding mechanism for provision of relief assistance to those affected by natural calamities is clearly laid down in schemes and norms. These are reviewed by the Finance Commission appointed by Government of India every five years. The Finance Commission makes recommendations regarding the division of tax revenues between the central and the state governments and also regarding policy of provision of relief assistance and their share of expenditure. A Calamity Relief Fund (CRF) has been set up in each state as per the recommendations of the Finance Commission. The size of the calamity relief fund is fixed by the Finance Commission after taking into account the expenditure on relief and rehabilitation over the previous years. The Government of India contributes 75% on the corpus of CRF and 25% is contributed by the State. Relief assistance to those affected by natural calamities is granted from CRF. Where the calamity is of such proportion that additional funds are required, the assistance is provided from the National Calamity Contingency Fund (NCCF) - a fund created by the central government. When such requests are received, the requirements are cleared by a High Level Committee. In brief, the institutional arrangements for response and relief are well established and have proved robust and effective. However, the norms and list of calamities need to be reviewed in context of the specific geographical conditions of the State.

According to recommendations by the 13th Finance Commission and provisions under the National Disaster Management Act (2005), the Calamity Relief Fund (CRF) has been restructured as the State Disaster Response Fund (SDRF), and the National Calamity Contingency Find (NCCF) has been restructured as the National Disaster Response Fund (NDRF) in 2010-11. There is also a provision for a separate fund called the State Disaster Mitigation Fund (SDMF).

The district collectors are the main assessing authorities for damages. A number of functionaries belonging to various departments like Revenue, Home, Medical, Animal Husbandry, Forests, Water supply, Public works, Health, Women and Child development etc., work in the districts. The District Collectors seek reports from all the concerned functionaries before arriving at a conclusion as to the extent of the damage. The norm of 50% damage to crops in a particular area is adopted to declare it a scarcity affected area.

Procedure for claiming under NCCF (NDRF)

The reports of the District Collectors are compiled at the State level and an overall picture of the extent and severity of the damage brought about is submitted to the Central Government for its own observations to assess the damages caused by the calamities. When requests are received for assistance from NCCF (NDRF), the requirements are assessed by a team from the Central Government and, thereafter, cleared by a High Level Committee.

Funds for Capacity Building

The Centre has allotted Rs. 6 Crore per year for five years (from the financial year 2010-11 to 2014-15) for capacity building of the administrative machinery in Disaster Management. These funds are planned to be used in activities as described the Chapter on Capacity Development and also on awareness generation through radio, electronic and print media, trainings, and production and dissemination of IEC materials etc.

Funds for Disaster Preparedness activities

The 12th Finance Committee had recommended provision for disaster preparedness and mitigation to be part of state plans. As of now, there is no provision of funds for disaster preparedness activities.

Other funding arrangements by State

Apart from these provisions, the State has created its own funds, such as the Rajasthan Rahat Kosh (RRK) with an initial pool of Rs. 6 Crore and the addition of Rs. 25 lac in subsequent years. This fund is used in rescue and relief activities, where it is not possible to pool in funds from other funding provisions (e.g. digging adjacent bore wells or tunnels to rescue children trapped in deep bore wells). MLAs, MPs, and others can contribute to this fund.

The Chief Minister's Relief Funds may also be explored for disaster relief. This fund is raised through public appeals when needed.

External Funding arrangements

As of now, the mechanism to avail funding from external sources like UN agencies, bilateral agencies and others through projects, programmes or any other arrangements have been limited to some specific projects.

Government of Rajasthan

State Disaster Management Plan (SDMP)

Part 2: Hazard Specific Action Plans

Chapter 11 - Drought – Action Plan

Probabilistic Scenario

Absence of adequate rainfall and prolonged extreme hot temperature generating dry seasons causing agriculture and income loss, deaths, health problems, water scarcity, food scarcity reducing/ diminishing the coping capacity of the local/ state Government to respond.

The following are the action plans for departments, agencies and stakeholders which shall be involved for immediate rescue, relief, response and rehabilitation operations in the event of a drought situation –

S. N	Department	Disaster Specific Action Plan
1	Agriculture Department	<u>Pre Drought situation</u> • Prepare crop contingency plan • Identify and assess the requirement for fodder depots. • Fodder supply: Identification of grazing land including forest land. • Promote crop insurance <u>During Drought Situation</u> • Assessment of crop damage • Establish food depots as per requirements • Ensure food security – transport food from FCI/ warehouse and if shortage still persists then import food grains from other states, other countries. • Fodder availability – transportation of fodders to affected areas, identify the areas having availability of excess fodder, appeal to farmers having excess fodder. • Supply of fodder at subsidized rates • Cattle feed subsidy • Issue periodic bulletins <u>Post Drought Measures</u> • Suggest/ implement Change in cropping pattern - Water saving crops like sass flower, castor, Jawar, Bajra and oil seeds to be introduced in drought prone areas. Likewise, in the IGNP area sugarcane, cotton and groundnut and in Kota area rice crop can be replaced by suitable low water

		consumption crops. • Promote sprinklers and drip irrigation methods. • Promotion of low irrigation requirement crops, drought tolerant seed varieties and other livelihood options in chronic drought prone areas.
2	Animal Husbandry	Pre Drought Situation • Prepare contingency plan • Promote cattle insurance • Constitute veterinary mobile teams with required resources like medicines, doctors, subordinate staff, laboratories, protective gears, antibiotics, vaccines and antitoxins, etc. in abundance. During Drought Situation • Constitute technical groups at state, zone and district levels. • Identification of affected areas. • Disposal of dead carcasses. • Focused attention to veterinary health. • Mass vaccination programme of animals in affected areas Make arrangements for rescue and evacuation of stranded livestock. • Pool in sufficient doctors for treatment of sick animals/ poultry. • Control spread of animal disease. • Carry out epidemiological surveillance to evade biological disasters. • Promote awareness through IEC activities.
3	Public Health Engineering Department (PHED)	Pre Drought Situation • Prepare Contingency plan • Enforce ground water legislation • Strict monitoring and vigilance on water for drinking purpose only. • Identify additional sources of water for maintenance of regular supply. During Drought Situation

		• Ensure supply of sufficient water through tankers for habitats and cattle camps. • Provide household water purification tablets. • Augmentation of existing Resources • Hiring of Private Wells • Hand Pump repair programme • Installation of New Hand Pumps and Tube wells • Revival of traditional water sources like Wells, Bawdis, Tankas, etc. • Transportation of water through road tankers and by Rail • Earmark water for drinking purpose available in the tanks and ensure no illegal pumping takes place. • Provide adequate quantity of bleaching powder to PRI, especially Gram Panchayats to protect spread of water and vector borne diseases. • Promote awareness on safe hygienic practices and sanitation.
4	Department of Medical and Health	Pre Drought Situation • Health and epidemiology surveillance • Constitute mobile teams with required resources like medicines, doctors, subordinate staff, laboratories, protective gears, antibiotics, vaccines, etc. in abundance. During Drought Situation • Mobile clinics for health check ups • Organise regular rural health camps and keep public informed of such camps. • Check the nutritional status especially for women and children and give treatment. • Check samples of food grains, cooked food in community kitchens, etc. • Promote general awareness of health and hygiene.
5	Disaster Management &	• Ensure coordinated movement of all concerned departments, officials and agencies for combating Drought. • Make sufficient funds available for Drought response.

	Relief (DM&R)	• Arrange regular meetings for updating the apex body and issue directions to all concerned departments regularly. • Document experiences and best practices.
6	Irrigation/ Water Resource department	• Assess and evaluate the supply and demand of water for crops and ensure rationing of water. • Strict monitoring / vigilance to avoid illegal pumping. • Maintenance and repair of Dams, canals. • Lining of canals and other water structure systems in order to reduce seepage losses in the conveyance system. • Deepening of wells • Identify underground streams/ aquifers. • Make sufficient arrangements for tube wells and new hand pumps and repair. • Making sufficient budget provisions.
7	Soil & Water Conservation Department	• Promote rain water harvesting structures. • Renovation of tanks and tankas – desilting of mud, strengthening of bunds, etc. and integrating the tanks with major canal systems, wherever feasible. • Promote farm ponds, percolation tanks, water retardant mulches and traditional/ indigenous techniques of water conservation.
8	Public Works Department (PWD)	• Listing of works that could be done as relief programmes - pond desilting, excavation of water structures, construction of Government infrastructures, etc. • Carry out sudden checks and supervise the relief works. • Generate employment through cash for work/ food for work relief programmes
9	Civil Supplies and Public Distribution System (PDS)	• Distribution of food packets, dry rations, fuel, oil and lubricants • Take precautionary steps against hoarding and profit mongering and ensure normal prices of commodities in the market. • Adequate supply and reserves of FOL and coordinate with all the national agencies for smooth transportation of food and civil supplies.

		• Supply daily necessities of food items, stock position and ensure continuous supply, in relief camp too. • Coordination with FCI/ warehouses. • Make public aware through media about food distribution and also about the availability of items at subsidized rates.
10	FCI/ Ware house	• Keep stock of food grains • In case of shortage inform administration for further procurements • Quick transportation/ distribution of food grains as per demand from administration. • Coordination with transport departments (road, rail and air).
11	Municipal Corpo ration	• Coordination and supply of safe drinking water using tankers, etc.
12	Railways/ Civil Aviati on/ Road Trans port	• Assist and give immediate clearance for transportation of relief materials. • Wherever possible, provide temporary storage space for relief materials. • Make arrangements for water trains on demand of the administration.
13	RDD	• Evaluate/ analyze the complete details of the drought situation in the state for effective drought management, proper information to higher officials for effective decisions on drought response. • Make provisions for sufficient budget for food products, grains, fodder, water and hand pumps, etc. • Coordinate with neighbouring states for sufficient arrangement for food, fodder, etc. • Regular monitoring of Drought relief works. • Distribution of relief materials to the needy in actual terms. • Ensure compliance of orders issued by Government from time to time. • Support PRI in organising cattle camps • Coordinate with other departments like health, animal

		husbandry, PHED and Water Resources. • Oversee maintenance of cattle camps and Gaushalas and ensure veterinary services, fodders, etc. are provided as per the norms. • Support price and subsidy to encourage cultivation of green fodder
14	District Administration	Pre Drought Situation • Prepare Drought Contingency Plan. • Issue necessary directions/ instructions to all concerned departments to combat the upcoming situation in an effective and coordinated manner. During Drought Situation • Ensure effective coordination with all departments, agencies, NGOs and stakeholders. • Arrange/mobilize equipment and resources like water tankers, trucks/ vehicles to transport food supply, fodder, mobile medical vehicles, ambulances, etc. • Arrange for disposal of dead carcasses. • Generate daily reports of relief activities and disseminate. • Organise relief camps wherever required; ensure pure drinking water, Sanitation, food, temporary shelters, basic relief materials as per requirements and need. • Update political leaders/ issue periodic bulletins. • Media Management
15	PRI (Zila Parishad, Panchayat Samiti and Gram Panchayat)	• Analyze the complete details of the drought situation in the district for effective drought management and inform the state administration for effective decisions on drought response. • In coordination with District Administration, arrange/mobilize equipment and resources like water tankers, tractors, trucks/ vehicles to transport food grains, fodder, mobile medical vehicles, ambulances, etc. • Appoint labourers for disposal of dead carcasses, distribution of food grains, fodder, etc. • Organise cattle camps wherever required; • Ensure safe drinking water, Sanitation, food, basic relief

		materials (fuel, oil, etc.) as per requirements and need. • Mass vaccination for domestic animals. • Arrange for release of compensation of agriculture losses based on the 'panchnama'.
16	AIR/ DD & other news channels	• Broadcast/ Telecast the current situation on a regular basis. • Issue bulletins on a periodic basis. • Promote general awareness on government programmes, relief measures and health and hygiene messages.
17	Department of Information and Public Relation	• Information dissemination, issue periodic bulletins to media. • Ensure information given to media are facts and true to avoid rumours. Arrange visit for local and foreign journalists in affected areas. • Information dissemination, update public on various relief interventions.
18	UN, International Agencies, Red Cross	• Support Government in all relief and response activities. • Work in collaboration with Government authorities and departments. • Specifically support Administration in the following sectors: water Supply, Sanitation, Hygiene Promotion, Food supply and Nutrition, livelihoods/ income generation activities, general awareness etc.
19	Emergency Operation Centre (EOC)	• Coordinate and issue direction to all concerned stake holders/ departments regularly

Chapter 12 - Earthquake – Disaster Action Plan

Probabilistic Scenario

The State of Rajasthan is in comparatively safer zone as per the seismic map of India; however, the experience of earthquake in other States like Bhuj earthquake in Gujarat, Latur earthquake in Maharashtra necessitates having an action plan for Earthquakes in the State.

A sudden occurrence of earthquake of magnitude 5 and above is likely to cause deaths and injuries to human beings, destroy urbanized and rural areas and damage all kinds of properties - both private and public.

The following are the action plans for departments, agencies and stakeholders which shall be involved for immediate rescue, relief, response and rehabilitation operations in the event of an earthquake –

S.	Department	Disaster Specific Action Plan
1	Disaster Management & Relief (DM&R)	<u>Alert and Warning stage:</u> • Ensure coordinated movement of all departments, officials and agencies for combating the disaster. <u>During Disaster Stage:</u> • Issue necessary directions and ensure effective and coordinated response of all departments. • Arrange regular meetings for updating the apex body on a daily basis. <u>Response and Rehabilitation Stage:</u> • Provide inputs to concerned departments for effective implementation of the rehabilitation plans. • Document the experiences and best practices.
2	Public Works Department (PWD)	<u>Alert and Warning Stage</u> • Issue warnings to all officials/ staff. • Manning of control room 24x7. • Maintain regular contact with EOCs at district/ state levels. • Keep all resources in the state of readiness. <u>Disaster Stage</u>

		• Assessment of damage to infrastructure, roads, bridges and buildings and commencement of restoration work. • Carry out search, rescue, evacuation, relief operation. • Clearance of roads and debris of collapsed infrastructures. • Identification and demolition of unsafe buildings/ infrastructures. • Barricade the disaster site and unsafe areas. • Identification and demarcation of safe areas and preparation of temporary shlters for relief camps. • Prepare temporary roads and bridges, helipads and air strips on the need basis for effective relief operations. • Deployment of heavy equipments like dozers, excavators, cranes, pulleys, power saws, gas cutters, L&Ts, JCBs and other specialist equipments and vehicles. <u>Response and Rehabilitation Stage</u> • Restoration of buildings, roads, bridges and other Government buildings. • Ensure close monitoring of response and rehabilitation operations and relief camps.
3	Police	<u>Alert and warning stage</u> • Manning of control room 24x7. • Maintain regular state of readiness <u>Disaster Stage</u> • Communication to EOC and stakeholders instantly. • As first responder assume command for security and law and order • Demarcate entries and exits for rescue and relief operation and proper traffic management. • Support SDRF, Civil Defence, Home Guard, Army, Sainik Kalyan and other first responders for search and rescue. • Take necessary actions to avoid rumours. • Ensure prevention of theft and loot. • Provide effective communication network work. • Deployment and monitoring of 108 ambulances.

		• Deployment of lady police personnel in relief camps for Gender concerns. <u>Response and Rehabilitation Stage</u> • Security arrangements for government property • Maintenance of law and order.
4	SDRF	<u>Alert and Warning stage:</u> • Issue warning to all officials/ staff. • Manning of control room 24x7. • Keep man, material and equipment in extreme state of readiness. <u>Disaster Stage</u> • Take lead for carrying out the search, rescue and evacuation operation. • Issue necessary directions to all assisting first responders for better coordination and effective operation. • Carryout an assessment and facilitate the authorities for providing all necessary gadgets, resources, manpower, etc. for conduct successful operation. • Interact with other SDRF and NDRF sources for necessary help. • Prioritise events to enable to take decision based on situation • Absolute planned distribution of resources and manpower for emergency response.
5	Civil Defence	• Assist police and administration in rescue and relief operation.
6	Home Guard	• Make Volunteers available • Help police in maintaining law and order situation.
7	NCC/ NYK and Scout Guide	• Make Volunteers available • Help police in maintaining law and order situation. • Assist local administration in rescue and relief operation as required.
8	Sainik Kalyan	• Deployment of specialist ex-servicemen for search, rescue,

		evacuation and relief activities. • Help police for feeding right information about the activities prevailing in the area (local intelligence) • Boosting the morale of the general public. • Interacting with public especially affected people by sharing experience of service; in a way making people overcome trauma, fear, stress. • Training awareness.
9	Indian Army/ Air force	Alert and Warning stage: • Issue warnings to all officials/ staff. • Manning of control room 24x7. • Keep all resources in a state of readiness. Disaster Stage • Assist the state in rescue and relief operation as required. • Arrangement of rescue equipment and manpower viz., generators, services of engineers, helicopters, vehicles, drivers, doctors, wireless, information gathering systems, etc. • Evacuation of stranded people and winching out affected people through helicopters. • Provide safety from theft. • Keep vigil on anti social elements, • Boosting the morale of the general public. • Establishment of relief camps and arrange for tents, food preparation and distribution, etc.
10	Fire/ Municipal Corporation	Alert and warning stage • Manning of control room 24x7. • Issue warnings to all Fire Service stations. • Keep all resources in a state of readiness Disaster Stage • Deployment of water tankers, tractors, cranes and other equipments like fire suits, masks, blankets, generator sets etc., and also ensures adequate availability of labourers.

		• Assist in evacuation, search and rescue operations. • Ensure availability of all types of extinguishers for fire following earthquakes. • Appoint labourers for excavation works; dismantle unsafe buildings, disposal of solid garbage and liquid waste, disposal of dead persons and carcasses. • Control other potential hazardous situations that might arise from oil, gas and hazardous material spills. <u>Response and Rehabilitation Stage</u> • Organise relief camps wherever required; ensure pure drinking water, Sanitation, food, temporary shelters, basic relief materials as per requirements and needs. • Assist in post disaster response and rehabilitation work
11	Department of Medical and Health	<u>Alert and warning stage</u> • Issue warnings to all officials/ staff. • Manning of control room 24x7. • Maintain regular contact with EOC. • Keep all ambulances, mobile teams, specialists, blood, medicines, paramedics, etc. in a state of readiness. <u>Disaster Stage</u> • Carry out triage. • Provide first aid to minor injuries. • Evacuate injured to hospitals. • Constitute and effectively deploy mobile teams having Doctors paramedical, • Set up health centres in relief camps and asure hygiene and sanitation. • Prevention/ control of epidemics and vaccination, availability of adequate x-ray machines and orthopedic, neurology equipment. • Availability of stretchers, blood, medicines, ambulances. • Arrange additional beds and medical treatment in local and nearby hospitals as required. • Psychosocial counselling to distressed people.

		Response and Rehabilitation Stage • Health and epidemiology Surveillance • Monitor nutrition status of affected people and take appropriate actions. • Maintain continuous supply of medicines and emergency services till normalcy is restored.
12	Animal Husbandry	Alert and warning stage • Issue warnings to all officials/ staff. • Manning of control room 24x7. • Keep manpower and medicines in a state of readiness Disaster Stage • Disposal of dead carcasses. • Make arrangements for rescue and evacuation of stranded livestock. Response and Rehabilitation Stage • Treatment of injured animals. • Control of animal disease. • Mass vaccination programmes of animals in affected areas
13	Railways	Alert and Warning Stage • Issue warnings to all officials/ staff. • Manning of control room 24x7. • Keep all resources in a state of readiness Disaster Stage • Regulate the movement of all trains • Carry out inspection of railway bridges and lines. • Adequate arrangement of special trains for transportation of relief materials. • Make adequate arrangements for evacuation of injured to railway hospitals. • Arrangement for continuous supply of stock. Response and Rehabilitation Stage • Repair and restoration of damaged railway lines and

		services as soon as possible. • Arrange for transportation of relief materials till normalcy is restored.
14	Civil Aviation/ Air Force	Alert and Warning Stage • Issue warnings to all officials/ staff. • Manning of control room 24x7. • Keep all resources in a state of readiness. Disaster Stage • Provide air services for evacuation. If required, arrange for choppers. • Ensure appropriate parking and flight facilities of aircraft engaged in rescue/relief work at airports. • Ensure quick air traffic clearance of aircraft arriving with relief material from abroad. Response and Rehabilitation Stage • Make quick repairs of affected airports, if damaged • Shift imperilled air traffic services to safer place.
15	Rajasthan State Road Transport Cooperation (RSRTC)	Alert and Warning Stage • Issue warnings to all officials/ staff. • Manning of control room 24x7. • Keep all resources in a state of readiness Disaster Stage • Regulate the movement of all buses • Identification of alternate routes for transportation. • Recovery of damaged vehicles. • Adequate arrangement of special buses for transportation of relief materials and manpower. • Make adequate arrangements for evacuation and transportation of homeless to relief camps. Response and Rehabilitation Stage • Arrange for transportation of relief material till normalcy is restored.

16	Transport/ NHAI	<u>Alert/ Warning stage</u> • Issue warnings to all officials/ staff. • Manning of control room 24x7. • Keep all resources in a state of readiness <u>Disaster Stage</u> • Provide ambulances and recoveries for rescue and evacuation. • Patrol important bridges and roads. • Make arrangements for dozers, excavators, road rollers, trucks for road and bridge repairs. • Provide safe and speedy passage for all vehicles, especially vehicles with relief materials. • Regulate traffic and avoid jamming and bottlenecks on the Highways. • Provide alternative roads for transportation, where ever required. <u>Response and Rehabilitation Stage</u> • Repair and reconstruct damaged/destroyed roads and bridges.
17	Public Health Engineering Department (PHED)	<u>Alert and Warning Stage</u> • Issue warnings to all officials/ staff. • Manning of control room 24x7. • Keep all resources in a state of readiness <u>Disaster Stage</u> • Ensure supply of safe drinking water regularly. • Identification and restoration of water sources • Acquire water tankers, mobile water treatment plants, and plastic water tanks as required. • Repair damaged systems, tube wells, etc. • Provide adequate purification tablets, bleaching powder etc. <u>Response and Rehabilitation Stage</u> • Make available sufficient water, bleaching powder and

		sanitation blocks for maintaining hygienic conditions in habitats, shelters, relief camps etc.
18	Education Department	Alert and Warning Stage • Operate Control Room round the clock and keep in touch with EOC • Generating awareness trhough IEC. • Issue warnings to all officials/ staff/ the education department staff/ school safety programes. • Keep manpower ready for emergency operations Disaster Stage • Help administration in providing staff, students to help in relief camps. Response and Rehabilitation Stage • Repair / Retrofitting, reconstruction work as early as possible. • Resume schools as early as possible.
19	Department of Industries (Chemical, Factories and Boilers, Petroleum)	Alert/ Warning stage • Issue warnings to all officials/ staff. • Manning of control room 24x7. • Keep all resources in a state of readiness • Identify and issue warnings to all Multi Hazard industries. Disaster Stage • Rescue, evacuate injured staff, people to safer places working in the industrial premises. • Carryout search, rescue and evacuation of labourers in the industrial areas. • Carryout thorough checks of leakages/ damages of such industries on occurrence of a disaster. • Provisions of HAZMAT and other specialists to be made during the disaster. • Make adequate safety arrangements for chemicals and industries using inflammable products. Response and Rehabilitation Stage • Restoration of production of disaster affected industries.

20	Department of Mining	Alert/ Warning stage • Issue warnings to all officials/ staff. • Manning of control room 24x7. • Keep all resources in a state of readiness • Identify and issue warnings to all Multi Hazard prone industries. Disaster Stage • Providing specialist vehicles such as L&T, JCBs, Gas cutters, dumpers, tractors at the disaster area. • Providing skilled manpower for search and rescue operations at the disaster site. Response and Rehabilitation Stage • Assist administration with manpower and equipment for faster restoration of normal activities to commence in the disaster area.
21	Department of Telecom (DoT)	Alert and Warning Stage • Issue warnings to all officials/ staff. • Manning of control room 24x7. • Keep all resources in a state of readiness Disaster Stage • Make arrangements for effective communication network to enable all relief actions to function effectively. • Seek support from private telecom companies as necessary. Rehabilitation Stage • Quick restoration of all damaged lines and networks. • Provide instant alarm/ warnings through wireless networks, e.g., SMS. • Public awareness through line/ wireless networks to prevent spread of propagandas. • Establish telephone centre for providing information of missing people and their families. • Providing facilities for affected people for communication to their families.

		• Developing hotlines for hassle free communication. • Repair and reinstall disrupted telecommunication systems.
22	Electricity Board	Alert and Warning Stage • Issue warnings to all officials/ staff. • Manning of control room 24x7. • Keep all resources in a state of readiness Disaster Stage • Immediately shut down the supply of electricity in the area Response and Rehabilitation Stage • Start restoration work of the damaged lines • Simultaneously, make electricity arrangements at the rehabilitation, relief camp areas.
23	Water Resource Department	Alert and Warning Stage • Issue warnings to all officials/ staff. • Manning of control room 24x7. • Keep all resources in a state of readiness. • Check status of irrigation canals, minor & medium irrigation tanks, dams. Disaster Stage • Continuous patrolling of the canal, dams and water structures. • In case of leakage or burst of irrigation tanks, dams, ensure rapid actions. • Issue periodic bulletins on the status of water structures. Response and Rehabilitation Stage • Repair and restoration of water structures where ever required.
24	Civil Supplies and Public Distribution System (PDS)	Alert and Warning Stage • Issue warnings to all officials/ staff. • Manning of control room 24x7. • Keep all resources in a state of readiness. • Check status of all godowns/ warehouses and PDS shops.

		Disaster Stage • Distribution of food packets, dry rations, fuel, oil and lubricants • Take precautionary steps against hoarding and profit mongering and ensure normal prices of commodities in the market. • Ensure adequate supply and reserves of FOL and coordinate with all the national agencies for smooth transportation of food and civil supplies. Response and Rehabilitation Stage • Supply daily necessities of food items, stock position, and ensure continuous supply, in relief camps too.
25	Warehouse	• Keep stock of food grains • Distribution as per demand of the administration.
26	Urban Housing Development (UHD)	Alert and Warning Stage • Issue warnings to all officials/ staff. • Manning of control room 24x7. • Keep all resources in a state of readiness. Disaster Stage • Assess the damage to infrastructure, roads, bridges and buildings and commencement of restoration work. • Carry out search, rescue, evacuation, relief operations. • Clearance of roads and debris of collapsed infrastructures. • Identification and demolition of unsafe buildings/ infrastructures. • Barricade the disaster site and unsafe areas. • Identification and demarcation of safe areas for relief camps. • Prepare temporary roads and bridges, helipads and air strips on a need basis for effective relief operations. • Preparation of temporary shelters for relief camps. • Deployment of heavy equipments like dozers, excavators, cranes, pulleys, power saws, gas cutters, L&Ts, JCBs and other specialist equipment and vehicles.

		Response and Rehabilitation Stage • Restoration of buildings, roads, bridges and other Government buildings. • Ensure close monitoring of response and rehabilitation operations and relief camps. • Comply with the National Building Code (BIS) and all other structural measures and bylaws for all constructions.
27	Rural Development Department (RDD)	Alert and Warning stage: • Issue warnings to all officials/ staff. • Manning of control room 24x7. • Keep all resources in a state of readiness. During Disaster Stage: • Distribution of relief materials to Panchayats, • Relief equipment, tractors, labour, digging/ excavation tools, etc. to be arranged to mobilising and raising fund. Response and Rehabilitation stage • Support PRI in organising relief camps wherever required • Ensure pure drinking water, Sanitation, food, temporary shelters, basic relief materials as per requirements and needs. • Arrangement of Rural relief camps • Arrangement of community kitchens. • Assist in post disaster response and rehabilitation work
28	District Administration	Alert and Warning stage: • Ensure coordinated movement of all departments, officials and agencies for combating the disaster. • Issue warnings to all officials/ staff. • Manning of control room 24x7. During Disaster Stage: • Ensure effective Communication, security, law and order. • Ensure effective coordination with all departments, agencies, NGOs and stakeholders. • Arrange/mobilize specialized equipment and material like

		cranes, dozers, generators, dumpers, etc. • Update political leaders/ issue periodic bulletins. <u>Response and Rehabilitation Stage:</u> • Procure tents, sanitation block, essential materials, etc. for relief camps. • Media Management. • Generate daily reports of relief activities and disseminate. • Organise relief camps wherever required; ensure pure drinking water, Sanitation, food, temporary shelters, basic relief materials as per requirements and needs.
29	PRI (Zila Parishad, Panchayat Samiti and Gram Panchayat)	<u>Alert and Warning Stage</u> • Issue warnings to all officials/ staff. • Manning of control room 24x7. • Keep all resources in a state of readiness. <u>Disaster Stage</u> • As first responders in the rural areas collect, collate, interpret and disseminate proper information to the higher officials for effective decisions/ disaster response. • Mobilise Community volunteers, Community Based Organisations (CBOs), SHGs, NGOs for combating disasters in the best of the fashion. • Appoint labourers for excavation works; dismantle unsafe buildings, disposal of solid garbage and liquid waste, disposal of dead persons and carcasses. <u>Response and Rehabilitation Stage</u> • Organise relief camps wherever required; ensure pure drinking water, Sanitation, food, temporary shelters, basic relief materials as per requirements and needs. • Mobilize people for mass vaccination, if required. • Mass vaccination for domestic animals. • Arrange for release of compensations based on the '*panchnama'*.
30	Tourism Cooperation	• Suspend all activities related to tourism in the affected area, and make available all resources for response and rehabilitation.

31	Archaeological Survey of India (ASI)	• Ensure that the national monuments are protected. • Tourists/ visitors are strictly restricted to visit these places.
32	AIR/ DD & other news channels	• Broadcast/ Telecast the current situation repeatedly. • Issue bulletins on a periodic basis. • Keep public informed on safety measures and survival measures.
33	Department of Information and Public Relation	<u>Alert and Warning Stage</u> • Operate the Control Room round the clock. • Nodal person to be designated as spokesperson for the Government. • Information dissemination, issue periodic bulletins to media. <u>Disaster Stage</u> • Ensure information given to media are facts and true to avoid rumours. Arrange visits for local and foreign journalists in affected areas. <u>Rehabilitation Stage</u> • Information dissemination, update public on interventions.
34	UN, International Agencies, Red Cross	• Support Government in all relief, response and rehabilitation activities. • Work in collaboration with Government authorities and departments. • Specifically support the daily functioning of relief camps – Water Supply, Sanitation, Hygiene Promotion, Shelter, Child Protection, Food supply and Nutrition, Education, Psycho social counselling, etc.
35	Indian Meteorological Department	• Transmit updated information to EOC • Mass media publicity/ issue bulletins at regular intervals.
36	Emergency Operation Centre	• Issue directions to all authorities, officials, departments and agencies.

(EOC)	• Brief the Disaster Management & Relief Commissioner regularly. • Coordinate the relief and rescue operation. • EOC to function as control room where all SDMA members and experts from various departments are available and take charge for effective coordination monitoring and implementation of rescue operations. • Prepare, forward and compile reports and returns from time to time. • Brief media regularly about the situation' • Brief/ Update the chief minister and cabinet about the situation.

Note:

As such there are no warning systems developed for the prediction of earthquakes. Therefore, the receipt of the first information to the EOC and stakeholders about the first occurrence of the earthquake incident is to be taken as the *alert and warning stage* for all practical purposes.

Chapter 13 - Floods, Flash Floods, Cloud Burst – Disaster Action Plan

Probabilistic Scenario

a) Floods likely to displace large number of people in Districts like Barmer, Kota, Baran, etc.
b) Continuous rainfall in major cities like Jaipur, Jodhpur etc. leading to sudden urban flash floods.
c) Release of water from reservoirs and dams causing wide spread flooding in villages and towns downstream.

The following are the action plans for departments, agencies and stakeholders which shall be involved for immediate rescue, relief, response and rehabilitation operations in the event of floods, flash floods –

S.	Department	Disaster Specific Action Plan
1	Irrigation/ Water Resource Department	<u>Alert and Warning Stage</u> • During monsoon/ heavy rains, carry out inspections of dams/ reservoirs on a daily basis and check the water level for issuance of alerts and warnings to locals as well as EOC. • As soon as the water reaches the danger mark in dams/ reservoirs, inform downstream communities for evacuation. • Arrangement of boats, floating devices, divers and community volunteers trained in search, rescue and water evacuation. • Evacuate people and animals to safer places. • Mass media publicity/ issue bulletins at regular intervals. • Issue warnings to all officials/ staff. • Manning of control room 24x7. <u>Disaster Stage</u> • Continuous patrolling over the canal, dams and water structures. • In case of leakage or burst of irrigation tanks and dams, ensure rapid action.

		• Coordinate with all concerned departments in rescue and relief operations • Issue periodic bulletins on the status of water structures. Response and Rehabilitation Stage • Make arrangements for pump sets, cranes, pulleys, dozers, earthmovers, and labourers for dewatering, clearance of fallen trees, electricity poles, mud pumping, etc. • Coordinate with administration in manning the relief camps. • Repair and restoration of water structures, wherever required.
2	Disaster Management & Relief (DM&R)	Alert and Warning stage: • Ensure coordinated movement of all departments, officials and agencies for combating the flood disaster. • During Disaster Stage: • Issue necessary directions and ensure effective and coordinated response of all departments. • Arrange regular meetings for updating the apex body on a daily basis. Response and Rehabilitation Stage: • Provide inputs and funds to concerned departments for effective implementation of rehabilitation plans. • Issue direction to document the experiences and best practices to all stake holders.
3	Public Works Department (PWD)	Alert and Warning Stage • Manning of control room 24x7. • Alert officials/ staff and keep all resources in a state of readiness. • Evacuate people and animals to safer places. Disaster Stage • Assess the damage of infrastructure, roads, bridges and buildings and commencement of restoration work. • Carry out search, rescue, evacuation, relief operations. • Clearance of roads and debris of collapsed

		infrastructures. • Identification and demolition of unsafe buildings/ infrastructures. • Barricade the disaster site and unsafe areas. • Identification and demarcation of safe areas for relief camps. • Prepare temporary roads and bridges, helipads and air strips on a need basis for effective relief operations as per requirements. • Preparation of temporary shelters for relief camps. • Deployment of heavy equipment like pump sets, dozers, excavators, cranes, pulleys, power saws, gas cutters, L&Ts, JCBs, and other specialist equipment and vehicles. <u>Response and Rehabilitation Stage</u> • Restoration of buildings, roads, bridges and other Government buildings. • Ensure close monitoring of response and rehabilitation operations, and relief camps.
4	Police	<u>Alert and warning stage</u> • Manning of control room 24x7. • Maintain regular state of readiness. • Arrange and earmark safe places for people and animals. <u>Disaster Stage</u> • Communication with EOC and stakeholders instantly. • As first responder, assume command for security and law and order • Demarcate entries and exits for rescue and relief operations and proper traffic management. • Support SDRF, Civil Defence, Home Guard, Army, Sainik Kalyan and other first responders for search and rescue. • Take necessary actions to avoid rumours. • Ensure prevention from theft and looting. • Provide effective communication network. • Deployment and monitoring of 108 ambulances.

		Response and Rehabilitation Stage • Deployment of lady police personnel in relief camps for Gender concerns. • Security arrangements for government property • Maintenance of law and order.
5	SDRF	Alert and Warning stage: • Issue warnings to all officials/ staff. • Manning of control room 24x7. • Keep men, material and equipment in an extreme state of readiness. • Evacuate people and animals to safer places. • Issue necessary directions to all assisting first responders for better coordination and effective operations. Disaster Stage • Take lead in carrying out search, rescue and evacuation operations. • Carryout an assessment and facilitate the authorities for providing all necessary gadgets, resources, manpower, etc. to carryout operations successfully. • Interact with other SDRF and NDRF sources for necessary help. • Prioritise events as per the situation on the ground. • Absolute planned distribution of resources and manpower for emergency response.
6	Civil Defence	• Assist police and administration in rescue and relief operations.
7	Home Guard	• Make Volunteers available • Help police in maintaining law and order.
8	NCC/ NYK and Scout Guide	• Make Volunteers available • Help police in maintaining law and order. • Assist local administration in rescue and relief operations as required.
9	Sainik Kalyan	• Deployment of specialist ex-servicemen, divers, for

		search, rescue, evacuation and relief activities. • Help police for feeding right information about the activities prevailing in the area (local intelligence) • Boosting the morale of the general public. • Interacting with public especially affected people by sharing the experience of service; in a way that makes people overcome trauma, fear, stress. • Awareness Generation.
		•
10	Indian Army/ Air force	<u>Alert and Warning stage:</u> • Manning of control room 24x7. • Keep all resources in a state of readiness. • Evacuate people and animals to safer places. <u>Disaster Stage</u> • Assist the state in rescue and relief operations, as required. • Arrangement of rescue equipment and manpower viz., pump sets, generators, services of engineers, helicopters, vehicles, drivers, doctors, wireless, information gathering systems, etc. • Evacuation of stranded people and winching out affected people through choppers. • Provide safety from looting and theft. • Keep vigil on anti social elements, • Boosting the morale of the general public. • Establishment of relief camps and arrange for tents, food preparation, food distribution, etc.
11	Fire/ Municipal Corporation	<u>Alert and warning stage</u> • Manning of control room 24x7. • Issue warnings to all Fire Service stations. • Alert officials/ staff and keep all resources in a state of readiness. • Arrangement of boats, floating devices, divers and community volunteers trained in search, rescue and

		water evacuation. • Evacuate people and animals to safer locations <u>Disaster Stage</u> • Deployment of water tankers, tractors, cranes and equipment like fire suits, masks, blankets, generator sets, pump sets, pulleys, dozers, earthmovers, labourers for dewatering, clearance of fallen trees, electricity Poles, mud pumping, etc. • Assist in evacuation, search and rescue operations. • Appoint labourers for excavation works; dismantle unsafe buildings, disposal of solid garbage and liquid waste, disposal of dead persons and carcasses. • Control other potential hazardous situations that might arise from oil, gas and hazardous material spills. <u>Response and Rehabilitation Stage</u> • Organise relief camps wherever required; ensure pure drinking water, Sanitation, food, temporary shelters, basic relief materials as per requirements and needs. • Assist in post disaster response and rehabilitation work
12	Department of Medical and Health	<u>Alert and warning stage</u> • Manning of control room 24x7. • Alert officials/ staff and keep all resources in a state of readiness. • Evacuate people and animals to safer places. • Keep all ambulances, mobile teams, specialists, blood, medicines, paramedics, etc. in a state of readiness. <u>Disaster Stage</u> • Carry out triage. • Provide first aid to minor injuries. • Evacuate injured to hospitals. • Constitute and effectively deploy mobile teams having Doctors paramedics, • Make available adequate vaccines, x-ray machines and orthopaedic equipments. • Availability of stretchers, blood, medicines, ambulances &

		sanitation blocks. • Arrange additional beds and medical treatment facilities in local and nearby hospitals as required. • Medical teams to reach out to people marooned in floods and are cut-off and have no access. • Psychosocial counselling to distressed people. • Response and Rehabilitation Stage • Health and epidemiology Surveillance. • Prevention/ control of epidemics. • Spray medicines/ chemical foams in stagnant water to eradicate mosquito breeding. • Health centres in relief camps. • Monitor nutrition status of affected people and take appropriate actions. • Maintain continuous supply of medicines and emergency services till normalcy is restored.
13	Animal Husbandry	<u>Alert and warning stage</u> • Manning of control room 24x7. • Alert officials/ staff and keep all resources in a state of readiness. • Evacuate people and animals to safer places. <u>Disaster Stage</u> • Disposal of dead carcasses. • Make arrangements for rescue and evacuation of stranded livestock. • provide assistance for supply of feed ingredients at nominal cost from the FCI <u>Response and Rehabilitation Stage</u> • Treatment of injured animals. • Control of animal diseases. • Mass vaccination programmes of animals in affected areas
14	Railways	<u>Alert and Warning Stage</u>

			• Manning of control room 24x7. • Alert officials/ staff and keep all resources in a state of readiness. <u>Disaster Stage</u> • Make adequate arrangements for evacuation of injured to railway hospitals. • Regulate the movement of all trains • Carry out inspection of railway bridges and lines. • Deployment of equipment like generator sets, pump sets, cranes pulleys, dozers, earthmovers, labourers for dewatering in stations, clearance of fallen trees, electricity Poles, mud pumping, etc. • Adequate arrangement of special trains for transportation of relief material. • Maintain arrangement for continuous rolling stock. <u>Response and Rehabilitation Stage</u> • Repair damaged to railway lines and restart disrupted railway services as soon as possible. • Arrange for transportation of relief material till normalcy is achieved.
15	Civil	Aviation/ Air Force/ Air Operation	<u>Alert and Warning Stage</u> • Manning of control room 24x7. • Alert officials/ staff and keep all resources in a state of readiness. <u>Disaster Stage</u> • Provide air service for evacuation. In case of road and rail lines blockage, mobilise/ arrange adequate choppers for winching affected people, air dropping relief materials, etc. • Ensure appropriate parking facilities of aircraft engaged in rescue/relief work at airports. • Ensure quick air traffic clearance of aircraft arriving with relief materials from abroad/ elsewhere. <u>Response and Rehabilitation Stage</u> • Make quick repairs of affected airports, if damaged

		• Shift imperilled air traffic services to safer places.
16	Rajasthan State Road Transport Cooperation (RSRTC)	Alert and Warning Stage • Manning of control room 24x7. • Alert officials/ staff and keep all resources in a state of readiness. Disaster Stage • Regulate the movement of all buses • Identification of alternate routes for transportation. • Recovery of damaged vehicles. • Adequate arrangement of special buses for transportation of relief material and manpower. • Make adequate arrangements for evacuation and transportation of homeless to relief camps. Response and Rehabilitation Stage • Arrange for transportation of relief material till normalcy is achieved.
17	Transport/ NHAI	Alert/ Warning stage • Manning of control room 24x7. • Alert officials/ staff and keep all resources in a state of readiness. Disaster Stage • Patrol important bridges and roads. • Make arrangements for dozers, excavators, road rollers, trucks, cranes, pulleys, pump sets (for dewatering) for repair of roads, bridges, etc. • Provide safe and speedy passage for all vehicles, especially vehicles with relief material. • Regulate traffic and avoid jamming and bottlenecks on the Highways. • Provide alternative roads for transportation, wherever required. Response and Rehabilitation Stage • Restrict movement of vehicles in areas where roads, embankments, etc., are occupied as self settled camps.

		• Repair and reconstruct damaged/destroyed roads and bridges.
18	Public Health Engineering Department (PHED)	Alert and Warning Stage • Manning of control room 24x7. • Alert officials/ staff and keep all resources in a state of readiness. Disaster Stage • Ensure supply of safe drinking water regularly. • Identification and restoration of water sources Response and Rehabilitation Stage • Acquire water tankers, mobile water treatment plants, and plastic water tanks as required. • Repair damaged systems, tube wells, etc. • Make available sufficient water, bleaching powder, adequate household purification tablets and sanitation blocks for maintaining hygienic conditions in habitats, shelters, relief camps etc.
19	Education Department	Alert and Warning Stage • Operate Control Room round the clock and keep in touch with EOC • Alert officials/ staff and keep all resources in a state of readiness. Disaster Stage • Provide schools that are safe and not damaged for temporary shelter of affected people. • Help administration in providing staff, students to help in rescue and relief operations. Response and Rehabilitation Stage • Deployment of equipment like cranes, generators sets, pump sets, pulleys, dozers, earthmovers, and labourers for dewatering, clearance of fallen trees, electricity Poles, mud excavation, etc. in schools • Repair/ Retrofitting, reconstruction work as early as possible. • Resume schools as early as possible.

20	Department of Industries (Chemical, Factories and Boilers, Petroleum)	Alert/ Warning stage • Manning of control room 24x7. • Alert officials/ staff and keep all resources in a state of readiness. • Identify and issue warnings to all Multi Hazard industries. Disaster Stage • Search, rescue, and evacuate injured staff, people to safer places working in the industrial premises. • Carryout thorough checks of leakages/ damages in Multi Hazard industries on occurrence of a disaster. • Provisions of HAZMAT and other specialists to be made available during the disaster, wherever required & provide the administration seeking such equipments • Make adequate safety arrangements in chemicals and industries using inflammable products. Response and Rehabilitation Stage • Restoration of production of disaster affected industries.
21	Department of Mining	Alert/ Warning stage • Manning of control room 24x7. • Alert officials/ staff and keep all resources in a state of readiness. • Identify and issue warnings to all Multi Hazard industries. . Disaster Stage • Providing skilled manpower for search and rescue operations at the disaster site • Deployment of equipment like pump sets, pulleys, dozers, earthmovers, labourers for dewatering, clearance of fallen trees, electricity poles, etc. in mining areas. • Providing specialist vehicles such as L&T, JCBs, Gas cutters, dumpers, tractors at the disaster areas, where ever required provide the administration seeking such equipments Response and Rehabilitation Stage

		• Assist administration with manpower and equipment for faster restoration of normal activities to commence in the disaster area.
22	Department of Telecom (DoT)	Alert and Warning Stage • Manning of control room 24x7. • Alert officials/ staff and keep all resources in a state of readiness. Disaster Stage • Make arrangements for effective communication networks to enable all relief actions to function effectively. • Seek support from private telecom companies as necessary. Rehabilitation Stage • Quick restoration of all damaged lines and networks. • Provide instant alarms/ warnings through wireless networks, e.g., SMS. • Public awareness through line/ wireless networks to evade propagandas. • Establish centre for providing information of missing people and their families. • Providing facilities for affected people to communicate with families. • Developing of hotline for hassle free communication. • Repair and reinstall disrupted telecommunication systems.
23	Electricity Board	Alert and Warning Stage • Manning of control room 24x7. • Alert officials/ staff and keep all resources in a state of readiness. Disaster Stage • Immediately shut down the supply of electricity in the area. Response and Rehabilitation Stage • Deployment of equipment for dewatering, clearance of

		fallen trees, electricity poles, etc. • Start restoration work of the damaged lines • Simultaneously make electricity arrangements at the rehabilitation, relief camp areas.
24	Civil Supplies and Public Distribution System (PDS)	Alert and Warning Stage • Manning of control room 24x7. • Alert officials/ staff and keep all resources in a state of readiness. • Check status of all the godowns/ warehouses and PDS shops and ensure that stocks are well protected. Disaster Stage • Distribution of food packets, dry ration, fuel, oil and lubricants, etc. • Take precautionary steps against hoarding and profit mongering and ensure normal prices of commodities in the market. • Adequate supply and reserves of FOL and coordinate with all the national agencies for smooth transportation of food and civil supplies. Response and Rehabilitation Stage • Supply daily necessities of food items, check stock position, and ensure continuous supply, in relief camps too.
25	FCI/ Warehouse	• Keep stock of food grains • Quick transportation/ distribution of food grains as per demands from the administration. • Coordination with transport departments (road, rail and air).
26	Urban Housing Development (UHD)	Alert and Warning Stage • Manning of control room 24x7. • Alert officials/ staff and keep all resources in a state of readiness. Disaster Stage • Carry out search, rescue, evacuation, and relief

		operations. • Deployment of equipment like cranes, generator sets, pump sets, pulleys, dozers, earthmovers, labourers for dewatering, clearance of fallen trees, electricity Poles, mud excavation, etc. • Assess and restore damage to infrastructure, roads, bridges and buildings. • Identification and demolition of unsafe buildings/ infrastructure. • Barricade the disaster site and unsafe areas. • Identification and demarcation of safe areas for relief camps. • Preparation of temporary shelters for relief camps. • Response and Rehabilitation Stage • Restoration of buildings, roads, bridges and other Government buildings. • Ensure close monitoring of response and rehabilitation operations and relief camps. • Comply with the National Building Code (BIS) and all other structural measures for all constructions.
27	RDD	<u>Alert and Warning stage:</u> • Manning of control room 24x7. • Alert officials/ staff and keep all resources in a state of readiness. • During Disaster Stage: • Distribution of relief materials to Panchayats, • Relief equipment tractors, labour, digging/ excavation tools, etc. to be arranged by mobilising and raising fund. • Response and Rehabilitation stage • Support PRI in organising relief camps wherever required; ensure pure drinking water, Sanitation, food, temporary shelters, basic relief material as per requirements and needs. • Arrangement of Rural relief camp • Arrangement of community kitchen.

		• Assist in post disaster response and rehabilitation work
28	District Administration	Alert and Warning stage: • Ensure coordinated movement of all departments, officials and agencies for combating the disaster. • Evacuate people and animals to safer places. • Manning of control room 24x7. • Issue warnings to all officials/ staff. During Disaster Stage: • Ensure effective Communications, security, law and order. • Ensure effective coordination with all departments, agencies, NGOs and stakeholders. • Arrange/mobilize specialized equipment and material like pump sets, generator sets, cranes, dozers, earth movers, pulleys, dumpers, labourers for dewatering, clearance of fallen trees, electricity poles, mud excavation, etc. • Update political leaders/ issue periodic bulletins. • provide assistance for arrangement of vehicles to be requisitioned for transport of affected animals • To arrange and earmark safe places for people and animals Response and Rehabilitation Stage: • Procure tents, sanitation blocks, essential materials, etc. for relief camps. • Media Management. • Generate daily report of relief activities and disseminate. • Organise relief camps wherever required; ensure pure drinking water, Sanitation, food, temporary shelters, and basic relief material as per requirements and needs.
29	PRI (Zila Parishad, Panchayat Samiti and Gram Panchaya	Alert and Warning Stage • Alert officials/ staff and keep all resources in a state of readiness. • Evacuate people and animals to safer places.

	t)	• Manning of control room 24x7. saster Stage • As first responders in the rural areas, collect, collate, interpret and disseminate proper information to higher officials for effective decisions/ disaster response. • Mobilise Community volunteers, Community Based Organisations (CBOs), SHGs, NGOs for combating disasters in the best way. • Arrange/mobilize specialized equipment and material like pump sets, generator sets, cranes, dozers, earth movers, pulleys, dumpers, and labourers for dewatering, clearance of fallen trees, electricity Poles, mud excavation, dismantle unsafe buildings, disposal of solid garbage and liquid waste, disposal of dead persons and carcasses. sponse and Rehabilitation Stage • Organise relief camps wherever required; ensure pure drinking water, Sanitation, food, temporary shelters, basic relief materials as per requirements and needs. • Mobilize people for mass vaccination, if required. • Mass vaccination for domestic animals. • Arrange for release of compensation based on the '*panchnama'.*
30	Tourism Cooperation	• Suspend all activities related to tourism in the affected area.
31	Archaeological Survey of India (ASI)	• Ensure that national monuments are protected. • Ensure that tourists/ visitors are strictly restricted to visit these places.
32	AIR/ DD & other news channels	• Broadcast/ Telecast the current situation repeatedly. • Issue bulletins on a periodic basis. • Keep the public informed on safety measures and survival measures.
33	Department of Information and	Alert and Warning Stage • Operate the Control Room round the clock.

	Public Relation	• Nodal person to be designated as spokesperson for the Government. • Information dissemination, issue periodic bulletins to media. <u>Disaster Stage</u> • Ensure information given to media are facts and true to avoid rumours. Arrange visit for local and foreign journalists to affected areas. <u>Rehabilitation Stage</u> • Information dissemination, update public on interventions.
34	UN, International Agencies, Red Cross	• Support Government in all relief, response and rehabilitation activities. • Work in collaboration with Government authorities and departments. • Specifically support the daily functioning of relief camps – Water Supply, Sanitation, Hygiene Promotion, Shelter, Child Protection, Food supply and Nutrition, Education, Psycho social counselling, etc.
35	Indian Meteorological Department	• Transmit updated information to EOC • Issue bulletins on weather conditions. • Mass media publicity/ issue bulletins at regular intervals.
	Emergency Operation Centre (EOC)	• Issue directions to all authorities, officials, departments and agencies. • Brief the Disaster Management & Relief Commissioner regularly. • Coordinate relief and rescue operations. • EOC to function as a control room where all SDMA members and experts from various departments are available and take charge of effective coordination monitoring and implementation of rescue operations. • Prepare, forward and compile reports and returns from time to time. • Brief media regularly about the situation' • Brief/ Update the chief minister and cabinet about the

situation.

Chapter 14 - Major Accidents (Rail, Road, Air) – Disaster Action Plan

Probabilistic Scenario

a) A major rail/ air/ road accident causing deaths and injuries to human beings and animals.
b) A Chemical accident due to transportation of hazardous material by road, rail and other means which is beyond the coping capacity of local administration to respond.

The following are the action plans for departments, agencies and stakeholders which shall be involved for immediate rescue, relief, response and rehabilitation operations in the event of accidents (rail, road, air) –

S. N	Department	Disaster Specific Action Plan
1	Railways	• Manning of control room 24x7. • Alert officials/ staff and keep all resources in a state of readiness. • Search, rescue and evacuate injured persons to safer places. • Assess the situation for appropriate actions. • Regulate the movement of all trains • Carry out inspection of railway bridges and lines. • Deployment of equipment like generators sets, pump sets, cranes pulleys, dozers, gas cutters, earthmovers, labourers for clearance of fallen bogies, electricity Poles, damaged tracks, etc. • Transport and provide emergency tents, water, medicines, food, etc. to the accident site. • Adequate arrangement of specialized trains for transportation of rescue and relief material. • Restoration of damaged railway lines, electricity poles to restart services as soon as possible.
2	Civil Aviation/ Air Force	• Manning of control room 24x7. • Alert officials/ staff and keep all resources in a state of readiness. • Search, rescue and evacuate injured persons to safer places. • Assess the situation for appropriate actions.

		• Regulate the movement of all flights, in case of accident at the airport. • Make available aircrafts for transporting injured persons from the accident spot to specific and specialist hospitals in the country. • Coordinate with the EOC and the local administration of the area. • Make quick repairs of airport, runway, etc., if damaged
3	Roadways	• Make adequate arrangements for evacuation and transportation of people/ passengers from accident site to their respective destinations. • Adequate arrangement of trucks and buses for transportation of rescue and relief material. • Recovery of damaged vehicles.
4	Municipal Corporation / Fire Department	• Deployment of fire vehicles, rescue equipments, ladders, water tankers for replenishment, tractors, cranes, gas cutters and other equipment like fire suits, masks, blankets, ropes, generator sets, etc. and also ensure adequate availability of labourers. • Search, rescue and evacuate people from damaged trains, buses, trucks, planes, etc. • Make available all types of fire extinguishers. • Maintain regular contact and update EOC.
5	Police	• Assume command for security and law and order. • Take measures for crowd control; demarcate entries and exits for rescue operation and proper traffic management. • Take necessary actions to avoid rumours. • Provide effective communication network. • Deployment and monitoring of 108 ambulances.
6	Department of Medical and Health	• Deploy ambulances, mobile team, paramedics, blood, medicines, etc. • Carry out triage and provide first aid to injure. • Evacuate injured to nearby hospitals. • Arrange for extra beds in the hospitals, avail the services of

		railway, private, army hospitals. • Establish emergency mobile hospital at the accident site for quick treatment. • Coordinate with EOC and transport authorities (rail, air, roads) for transportation of adequate medicines, stretchers, beds, blood, etc. to the site of accident as required.
7	Public Works Department	• Barricade the incident area(s) and demarcate entries and exits for rescue operations. • Make alternative routes. • Provide equipment and material like gas cutters, ladders, vehicles, dozers, tractors, cranes, pulleys, etc. as per the requirements of the administration.
8	Civil Defence	• Help police and administration in rescue work. • Deploy ambulances, first aid, fire vehicles, fire men, etc.
9	Home Guard	• Make Volunteers available • Help police in maintaining law and order situation.
10	District/ Local Administration	• Make arrangements for emergency tents, shelter facilities for affected passengers/ people in dharmashalas, schools, other Government buildings, supply of drinking water, medicines, food and other required relief material. • Issue direction and coordination with concerned departments and stakeholders. • Media Management. • Issue periodic bulletins and update political leaders. • Constitute a committee for assessment of the situation and for loss and damage of life, properties, infrastructures, crops, animals, etc. • Provide compensation as per the assessment to injured, deceased, etc. as per the assessment.
11	Army	• Provide doctors, hospitals, vehicles and other rescue materials, and communication network as aid to civil authorities.
12	Department of Indust	• Provide equipment and material like ladders, vehicles, dozers, tractors, cranes, pulleys, HAZMAT vehicles, etc. as per

	ries	the requirements of the administration.
13	Department of Mining	• Provide equipment and material like ladders, vehicles, dozers, tractors, cranes, pulleys, vehicles, ropes, etc. as per the requirements.
14	Department of Telecom	• Maintain proper communication network. • Restoration of damaged lines and network.
15	Electricity Board	• Shut down the supply of electricity. • Restoration of damaged lines and network
16	Civil Supplies	• Distribution of food packets, dry ration, fuel, oil and lubricants, etc. as per the directions of the administration.
17	Media	• Issue bulletins on a periodic basis. • Flash/ publish the list of names of injured, deceased in the accident. • Inform public on Government interventions.
18	PRO	• Ensure information given to media are facts and true to avoid rumours.
19	UN, NGO	• Provide first aid, health services, financial assistance, relief materials, etc.
20	Emergency Operation Centre (EOC)	• Issue directions to all authorities, officials, departments and agencies. • Brief the Disaster Management & Relief Commissioner periodically. • Brief/ Update the chief minister and cabinet about the situation.

Chapter 15 - Fire (Urban, Forest, Oil) – Disaster Action Plan

Probabilistic Scenario/ Real Incident

A fire caused due to an explosion of LPG gas in a hotel, cinema Hall, mall, etc. or a bomb blast at various hubs and busy market places causing a major fire accident.

The following are the action plans for departments, agencies and stakeholders which shall be involved for immediate rescue, relief, response and rehabilitation operations in the event of a fire accident –

S.	Department	Disaster Specific Action Plan
1	Municipal Corporation / Fire Department	• <u>Urban Fire:</u> • Deployment of fire vehicles, rescue equipment, ladders, water tankers for replenishment, tractors, cranes and other equipment like fire suits, masks, blankets, ropes, generators sets, etc. and also ensure adequate availability of labourers. • Search, rescue and evacuate people from buildings, work places, factories, etc. to safer locations. • Make available all types of fire extinguishers. • Appoint labourers for excavation works; dismantle unsafe buildings, disposal of dead persons. • Maintain regular contact and update EOC. • <u>Forest Fire:</u> • Requisition and deploy choppers on requirement basis, fire fighting vehicles, etc. • Identify hydrants and water sources in the complete area of incident. • Earmark alternative routes. • Make fire strips. • Identify and earmark safe passage areas for wild life during the incident. • Disposal of carcasses. • Coordination for installation with fire experts, equipment &

		machineries. If required, seek for support from neighbouring districts/ States. • Monitoring through satellite based forest fire system through ISRO. • Maintain regular contact and update EOC. • <u>Oil Fire:</u> • Deployment of fire vehicles, rescue equipment, ladders, water tankers for replenishment, tractors, cranes and other equipment like fire suits, mask blankets, ropes, generators sets, etc., and also ensure adequate availability of labourers. • Identify water hydrants at the fire site. • Search, rescue and evacuate people from factories, site, etc. to safer locations. • Make available all types of fire extinguishers and specialist vehicles for oil fires, short circuit and chemical fires. • Maintain regular contact and update EOC. • Identify and coordinate with refineries, mutual aid groups and oil depots and other agencies for pooling in more fire fighting equipment and manpower.
2	Police	• Assume command for security and law and order. • Take measures for crowd control; demarcate entries and exits for rescue operations and proper traffic management. • Take necessary actions to avoid rumours. • Provide effective communication network. • Deployment and monitoring of 108 ambulances. • Security of relief camps.
3	Public Works Department	• Barricade the incident area(s) and demarcate entries and exits for rescue operations. • Make alternative routes. • Provide equipment and material like ladders, vehicles, dozers, tractors, cranes, pulleys, etc. as per the requirements of the administration.
4	Civil Defence	• Help police and administration in rescue work.

		• Deploy ambulances, first aid, fire vehicles, fire men, etc.
5	Home Guard	• Make Volunteers available • Help police in maintaining law and order.
6	NCC/ NYK and Scout Guide	• Make Volunteers available • Help police in maintaining law and order. • Assist local administration in rescue and relief operations, as required.
7	Department of Medical and Health	• Deploy ambulances, mobile teams, paramedics, blood, medicines, stretchers, etc. • Carry out triage. • Provide first aid to injured. • Evacuate injured to hospitals. • Establish emergency burn wards/ trauma care.
8	District/ Local Administration	• Constitute committee for assessment of the situation, and loss and damage of life, properties, infrastructure, crops, animals, etc. • Provide compensation as per the assessment to injured, deceased, etc. as per the assessment.
9	Army	• Provide doctors, hospitals, vehicles and other rescue material, and communication network as aid to civil authorities.
10	Animal Husbandry	• Treatment of affected animals. • Disposal of dead carcasses
11	Railways	• Provide doctors, hospitals, vehicles and other rescue material, and communication network as aid to civil authorities.
12	Department of Industries (Chemical, Factories and	• Caution multi hazard industries • Provide equipment and material like ladders, vehicles, dozers, tractors, cranes, pulleys, HAZMAT vehicles, etc. as per the requirements of the administration.

	Boilers, Petroleum)	
13	Department of Mining	• Provide equipment and material like ladders, vehicles, dozers, tractors, cranes, pulleys, vehicles, ropes, etc. as per the requirements of the administration.
14	Department of Telecom (DoT)	• Maintain proper communication network. • Restoration of damaged lines and network.
15	Electricity Board	• Immediately shut down the supply of electricity in the area. • Restoration of damaged lines and network
16	Media	• Issue bulletins on a periodic basis. • Inform the public on Government interventions.
17	PRO	• Ensure information given to media are facts and true to avoid rumours.
18	NGO	• Provide first aid, health services, financial assistance, relief material, etc.
19	Emergency Operation Centre (EOC)	• Issue directions to all authorities, officials, departments and agencies. • Brief the Disaster Management & Relief Commissioner periodically. • Brief/ Update the chief minister and cabinet about the situation.

Chapter 16 - Incidents in Mines Industry – Disaster Action Plan

Probabilistic Scenario

a) An explosion in a deep mining site trapping a large number of labourers underground.
b) Collapse/ landslide in the mining area, open- mining, sudden inundation of water in the mines, etc.

The following are the action plans for departments, agencies and stakeholders which shall be involved for immediate rescue, relief, response and rehabilitation operations in the event of an accident in a mine –

S.	Department	Disaster Specific Action Plan
1	Department of Mining	• Providing specialist vehicles such as L&T, JCBs, Gas cutters, improvised lifts, equipments for tunnels etc. dumpers, tractors at the disaster area. • Providing skilled manpower for search and rescue operations at the disaster site. • Insurance of all workers • Local Communication System
2	Police	• Assume command for security and law and order. • Take measures for crowd control, demarcate entries and exits for rescue and relief operations and proper traffic management. • Take necessary actions to avoid rumours. • Provide effective communication network. • Deployment and monitoring of 108 ambulances.
3	Fire/ Municipal Corporation	• Assist in evacuation, search and rescue operations. • Availability of all types of equipment – fire engines, excavation machines, long ladder vehicles, Dewatering sets, Pump sets, JCB, Cranes, Dumpers, Ropes, Oxygen BA sets, Divers etc.
4	Department of Medical and	• Deployment of adequate ambulances, mobile teams, stretchers, specialists, medicines, first aid kits, paramedics,

	Health	etc. . • Provide first aid to injured persons. • Arrangement for Beds and Blood in Hospitals, Oxygen, Orthopaedic& X-Ray machines, post mortem arrangements near the site. • Maintain continuous supply of medicines and emergency services till normalcy is restored.
5	District Administration	• Ensure coordinated movement of all departments, officials and agencies for combating the disaster. • Arrange/mobilise specialized equipment and material like cranes, dozers, generators, dumpers, etc. • Arrangement of relief material • Assessment of loss of men and material • Financial assistance as per norms • Issue periodic bulletins. • Media Management.
6	Emergency Operation Centre (EOC)	• Coordinate the rescue operation. • Issue directions to all concerned departments for quick emergency response. • Brief the Disaster Management & Relief Commissioner. • Brief media regularly about the situation.
7	Transport Department	• Making alternate arrangements of vehicles and transport as per the demand of the administration
8	Insurance Companies	• Ensure early payments to all insured labourers
9	Telecom	• Restoration of lines
10	PWD	• Provide JCBs, Cranes, L&Ts and other rescue equipment
11	PHED	• Arrange for Generators, Pump sets, Dewatering
12	Irrigation	• Deploy divers, Pump sets, etc.

Chapter 17 - Sand Storm & Andhi – Disaster Action Plan

Probabilistic Scenario

A sudden occurrence of sand storm/ high winds 'A*ndhi*' causing deaths, loss of property, damage to houses and infrastructure, creating dust, and spreading filth, garbage and sand in the area thus making the area unhygienic.

The following are the action plans for departments, agencies and stakeholders which shall be involved for immediate rescue, relief, response and rehabilitation operations in the event of a sand storm –

S. N	Department	Disaster Specific Action Plan
1	District Administration	• Issue alerts and warnings to all departments, agencies, stakeholders, etc. • Constitute committee for assessment of the situation, and loss and damage of life, properties, infrastructure, crops, etc. • Evaluate/ analyze the complete details of the incident/ situation and send a detailed report to higher authorities for effective decision making. • Arrange for release of compensation. • Generate daily reports of relief/ response activities and disseminate. • Issue periodic bulletins. • Media Management.
2	Municipal Corporation/ Fire Department	• Issue alerts and warnings through mega phones, cable TVs, radio, etc. • Evacuate people affected to safer places. • Assess all damages and losses to take appropriate decisions. • Deployment of equipment and resources like cranes, tractors, JCB, L&T, ropes, pulleys, dozers, sufficient labourers, etc. for the removal of fallen trees, hoarding, electricity and telephone lines and other obstacles. • Disposal of sand deposits, dead persons, carcasses, garbage, etc. • Coordinate with all concerned departments, agencies and

		stakeholders. • Coordinate and update EOC on actions take regularly.
3	Public Works Department (PWD)	• Provide equipment and resources to the administration like ladders, cranes, tractors, JCB, L&T, ropes, pulleys, dozers, sufficient labourers, etc. for the removal of fallen trees, removal of unsafe and fallen hoardings, electricity and telephone lines and other obstacles. • Barricade the incident area(s) and demarcate entries and exits for rescue operations. • Make alternative routes. • Restoration of roads, bridges and other infrastructure.
4	Police	• Issue alerts and warnings through mega phones, etc. • Rescue and evacuate people affected to safer places. • Assume command for security and law and order. • Take actions for crowd control, demarcate entries and exits for rescue operations and proper traffic management. • Take necessary action to avoid rumours. • Provide effective communication network.
5	Department of Medical and Health	• Deploy ambulances, mobile teams, paramedics, blood, medicines, stretchers, adequate x-ray machines and orthopaedic equipment, etc. • Provide first aid to injured persons. • Evacuate injured to hospitals. • Maintain continuous supply of medicines and emergency services till normalcy is restored.
6	Public Health Engineering Department (PHED)	• Evacuate people affected to safer places. • Where electricity is cut off, make arrangements for water supply through tankers and other alternative means and arrangements of generator sets. • Restoration of water supply structures, tube wells, hand pumps, etc.
7	Electricity Board	• Shut down the supply of electricity in the area.

		• Restoration of damaged lines and network
8	Civil Defence	• Assist police and administration in rescue and relief operations.
9	Home Guard	• Make Volunteers available • Help police in maintaining law and order situation.
10	NCC/ NYK and Scout Guide	• Make Volunteers available • Help police in maintaining law and order situation. • Assist local administration in rescue and relief operations as required.
11	Animal Husbandry	• Treatment of affected animals. • Disposal of dead carcasses
12	Railways	• Provide doctors, hospitals, vehicles and other rescue material, and communication network as aid to civil authorities.
13	Roadways	• Deploy trucks, tractors, dumpers, buses, for transporting damaged remains, hoardings, fallen trees, people, etc.
14	Department of Telecom	• Maintain proper communication network. • Restoration of damaged lines and network.
15	Departments of Mines	• Provide equipment and material like ladders, vehicles, dozers, tractors, cranes, pulleys, vehicles, ropes, etc. as per the requirements of the administration.
16	PRI (Zila Parishad, Panchayat Samiti and Gram Panchayat)	• Issue alerts and warnings through mega phones, cable TVs, radio, etc. • Evacuate people affected to safer places. • Assess all damages and losses to take appropriate decisions. • Deployment of equipment and resources like cranes, tractors, JCB, L&T, ropes, pulleys, dozers, sufficient labourers, etc. for the removal of fallen trees, hoardings, electricity and telephone lines and other obstacles. • Disposal of sand deposits, dead persons, carcasses, garbage, etc.

		• Coordinate with all concerned departments, agencies and stakeholders. • Coordinate and update EOC on actions taken regularly.
17	Media	• Issue bulletins on a periodic basis. • Inform public on Government interventions.
18	PRO	• Ensure information given to media are facts and true to avoid rumours.
19	UN, NGO	• Provide first aid, health services, financial assistance, relief material, etc.
20	Emergency Operation Centre (EOC)	• Issue directions to all authorities, officials, departments and agencies. • Brief the Disaster Management & Relief Commissioner periodically. • Brief/ Update the chief minister and cabinet about the situation.

Chapter 18 - Terrorism – Disaster Action Plan

Probabilistic Scenario

a) A bomb blast at a public place like bus stand, railway station, cinema hall, airport, taxi stand, hotel, malls, busy corner, places of high foot falls, key installations, tourist destination, religious place, etc. causing death, panic among public, fire accident, damage to properties and putting the situation at high risk which is beyond the control of the public and local administration.

The following are the action plans for departments, agencies and stakeholders which shall be involved for immediate rescue, relief, response and rehabilitation operations in the event of terrorist attacks–

S. N	Department	Disaster Specific Action Plan
1	Intelligence Bureau/ RAW / Military Intelligence / Police Intelligence	• Collect, collate, interpret and disseminate the intelligence pertaining to the suspicious/ terrorism/ anti national activities to State Department of Home and State Police Authorities on a regular basis.
2	ATS, Police	• Manning of control room 24x7 and update EOC regularly. • Assume command of the incident for security & law and order. • Carry out thorough rapid assessment to understand the situation. • Crowd control, cordon/ demarcate entries and exits for rescue operations and proper traffic management. • Deploy bomb disposal squads and bullet proof resources and equipments for handling the situation. • Deployment of quick reaction team for combating the threat. • Evacuate people to safer places. • Coordinate with CRPF, Rapid Action Forces and NSG, Military

		on a requirement basis. • Deploy manpower and equipment for rescue operations. • Take necessary actions to avoid rumours. • Issue bulletins/ update the situation to the public through media. • Provide effective communication network. • Arrange blood donors through Community Liaison Groups (CLGs) • Deployment and monitoring of 108 ambulances. • Carry out assessment and constitute teams for apprehending the terrorists. • Issue alerts at all public places like bus stands, railway stations, cinema halls, airports, taxi stands, *naka bandi* (check points), malls, busy corners, places of high foot fall, key installations like the Rawatbhatta Nuclear Power Plant, tourist destinations, religious places, etc. • Prepare and issue sketches of the culprits/ terrorists to inform the Public. • Thorough search, seizure operations at all likely escape routes such as bus stands, railway stations, cinema halls, airports, busy corners, etc. • Carry out thorough combing operations in the area. • Carry out extensive raids for apprehending the offenders/ terrorists.
3	Army/ Air Force	• Assume command of operations and assist local police. • Evacuate people to safer places. • Carry out rapid assessment of the situation. • Coordinate with CRPF, Rapid Action Forces and NSG, local police. • Deploy equipment for rescue operation choppers. • Provide effective communication network.
4	Civil Defence	• Help police and administration in rescue work. • Evacuate people to safe places. • Deploy ambulances, first aid, fire vehicles, fire men, etc.

5	Home Guard	• Help police in maintaining law and order situation. • Evacuate people to safer locations.
6	Department of Medical and Health	• Deploy ambulances, mobile teams, and paramedics and make arrangements of stretchers, first aid kits, beds, blood, medicines, etc. • Carry out triage and provide first aid to injured people. • Evacuate injured to nearby hospitals. • Arrange for extra beds in the hospitals, avail the services of railway, private, army hospitals.
7	Public Works Department	• Barricade the incident area(s) and demarcate entries and exits for rescue operations. • Make alternative routes. • Provide equipment and material like gas cutters, ladders, vehicles, dozers, tractors, cranes, pulleys, etc. as per the requirements of the administration.
8	District Administration	• Issue directions and coordinate with the concerned departments to support the operation conducted by Army, Police, etc. • Media Management. • Issue periodic bulletin and update political leaders. • Constitute committee for assessment of loss and damage of life, properties, infrastructure, etc. and provide compensation.
9	Municipal Corporation / Fire Department	• Deployment of fire vehicles, rescue equipment, ladders, water tankers for replenishment, tractors, cranes, gas cutters and other equipment like fire suits, masks, blankets, ropes, generator sets, etc. and also ensure adequate availability of labourers. • Search, rescue and evacuate people to safer areas. • Make available all types of fire extinguishers, equipment, vehicles, etc.
10	Department of Telecom	• Maintain proper communication network. • Restoration of damaged lines and network.

11	Electricity Board	• Maintain regular electricity. • Make additional light arrangements for successful search and rescue operations. • Restoration of damaged lines and network
12	Media	• Issue bulletins on a periodic basis. • Flash/ publish the list of names of injured, deceased in the accident. • Inform public on Government interventions.
13	PRO	• Ensure information given to media are facts and true to avoid rumours.
14	NGO	• Provide first aid, health services, financial assistance, relief materials, etc.
15	Emergency Operation Centre (EOC)	• Issue directions to all authorities, officials, departments and agencies. • Brief the Disaster Management & Relief Commissioner periodically. • Brief/ Update the chief minister and cabinet about the situation.

Chapter 19 - Nuclear Incidents – Disaster Action Plan

Probabilistic Scenario

a) An accident taking place in the nuclear fuel cycle including the Nuclear reactor, or in a facility using radioactive sources, leading to a large-scale release of radioactivity in the environment.
b) An (criticality) accident in a nuclear fuel cycle facility where an uncontrolled nuclear chain reaction takes place inadvertently, leading to bursts of neutrons and gamma radiations.
c) An accident during the transportation of radioactive material.
d) The malevolent use of radioactive material as a Radiological Dispersal Device by terrorists for dispersing radioactive material in the environment.
e) A large-scale nuclear disaster, resulting from a nuclear weapon attack (as had happened at Hiroshima and Nagasaki) or caused due to Natural Disaster like earthquake (Fukoshima Plant in Japan), would lead to mass casualties and destruction of large areas and property.

The following are the action plans for departments, agencies and stakeholders which shall be involved for immediate rescue, relief, response and rehabilitation operations in the event of a nuclear / radiological disaster –

S. N	Department	Disaster Specific Action Plan
1	District Administration	• <u>Pre Disaster:</u> • Prepare public for nuclear disaster without creating fear psychosis/ panic both at domestic and at state level. • To initiate & coordinate all Government resources for all the three (pre, during, post) disaster stages. • Identify and sensitize NGOs & Voluntary organisations for dissemination of awareness, etc. • Make sure instruments such dosimeters, NBC suits, radiation detection instruments are procured and are duly calibrated in adequate number. • <u>During Disaster:</u> • Coordinate among all districts and outside agencies including NGOs and other stakeholders. • Announcement of the incident through loudspeakers, TV, radio, local cables, effective use of mass media, etc. • Make public aware about do's and don'ts for humans and livestock.

		• Identification of under homes/ basements and safe places for uncontaminated PPL and materials. • Establish alternative control rooms which should be at least 10 kilometres away from the main control centre. • Coordinate and brief additional sources coming to affected areas. • Coordinate with State/ National relief sources. • Instruct uniformly all agencies in mitigating the consequences of nuclear disasters. • Requisitioning specialists and scientists from nearest nuclear power and Department of Atomic Energy to carry out survey to combat the operation. • Assist the Radiological officers to assess the initial potential for radiation exposure to the general population in the immediate or affected area. • Issue periodic bulletins. • Coordinate with surrounding districts and states.
2	Department of Medical and Health	• Coordinate the evacuation and earmark hospitals for nuclear victims. • Assess and make a master plan for treatment of nuclear victims. • Deployment of adequate ambulances, mobile teams, paramedics: procurement and distribution of suppressive medicines like, iodine, protective clothing and equipments. • Ensure appropriate number of shelters and decontamination stations in the areas in anticipation of evacuation. • Reception of additional medical teams from unaffected areas and assigning duties. • Safe disposal of water, garbage. • Coordinate with PHED, Municipal Corporation and Police for manpower to protect uncontaminated drinking water, over head concrete tanks and for use of permanent/ improved incinerators for safe disposal of contaminated waste. • Coordinate with organisations like Red Cross.

		• Maintain continuous supply of medicines and emergency services till normalcy is restored.
3	Civil Defence	• Mobilize full complement of civil defence personnel with equipment and material to ensure proper care of victims, maintenance, inspection and accounting of materials at posts, depots, centres and other sites as required. • Take over sites where mass cremation is required. • Keep ready trenches for burying estimated number of causalities. • Ensure coordination of public warning systems. • Evacuate humans and animals to safer places. • Manage the relief camps. • Intensify publicity campaigns. • Assist administration as required.
4	Home Guard	• Assist police in maintaining law and order.
5	Army	• Deployment of NBC qualified personnel to assist the administration for combating the disaster situation. • Make available transport vehicles, doctors, hospitals, beds and assist in identifying and manning the relief camps. • Provide protective clothing and equipment for operators and victims. • Coordinate with police and law enforcing agencies to maintain law and order.
6	Police	• Assume command of incident and ensure security & law and order with emphasis on - • Establishing inner cordon of all the main and minor arteries of the affected dropping lanes of the nuclear blast. • To restrict entry of unauthorized and unprotected persons, livestock, vehicles coming from the affected area. • Provide protection to relief camps and relief columns carrying essential resources like food, water, medicines, etc.

		• Ensure no mass panic sets in the population. • Arrange reception centres to receive and coordinate additional law and order forces. • Deploy quick reaction teams. • Protection to vulnerable populations like women, children, and old aged, disabled, etc. • Management of choke points for smooth movement of traffic. • Use protective clothing and equipments while carrying out the evacuation operation. • Take necessary actions to avoid rumours. • Provide effective communication networks.
7	Public Health and Engineering Department	• Work out details of protected water in the state and the holding capacity. • Ensure pumping of uncontaminated ground water and ensure protective storage and transportation. • Work out water requirements for human, livestock and decontamination units with concerned designated authorities. • Arrange for groundwater tankers in relief camps and hospitals. • Coordinate with police for protection of vulnerable water points to prevent unruly mobs from contamination and wasting water.
8	Civil Supply Department.	• Making available tinned/ protected pre cooked food stock. • Identify cold storage/ underground/ concrete warehouses and store all the holdings to be utilised. • Coordinate with police for protection of such stocks to ensure that the panicked mob does not loot these resources. • Ensure sufficient stock of fuel, oil and lubricants. • Evaluate and prepare additional resources required to be brought from unaffected areas.
9	Animal Husband	• Safe disposal of dead carcasses.

	ry	• Ensure movement of animals to uncontaminated areas. • Safe disposal of dead bodies and carcasses to prevent contamination through carnivorous birds and animals. • Ensure milk and other products and stock are not contaminated.
10	Municipal Corporation/ Fire Department	• Organise reception centres at assembly points • Coordinate resources of voluntary organisations. • Move people to safer locations • Make announcements through loudspeaker, mega phones, TV, local cable, etc. • Coordinate with all concerned departments for effective response.
11	State Pollution Board	• Monitor extent and quantum of radiation during the crisis.
12	Transport Department	• Making alternate arrangements of vehicles and transport as per the demand of the administration.
13	Telecom	• Ensure communication networks • Restoration of lines
14	Water Resource Department	• Assess and check sources that are contaminated and ensure these sources are not used for consumption. • Take adequate measures to protect sources from being contaminated.
15	Indian Meteorological Department	• Issue warnings • Periodically update the administration and EOC on the wind direction and speed so that the assessment of radiation flow and speed can be determined. .
16	Emergency Operation Centre (EOC)	• Coordinate the rescue operation. • Issue directions to all concerned departments for quick emergency response. • Brief the Disaster Management & Relief Commissioner. • Brief media regularly about the situation.

- Maintain a regular event log.

Chapter 20 - Heat Wave – Disaster Action Plan

Probabilistic Scenario

Absence of rainfall and prolonged extreme temperature above 48^0 C generating heat waves and causing deaths, crop loss, water scarcity and diseases and health problems.

The following are the action plans for departments, agencies and stakeholders which shall be involved for immediate rescue, relief, response and rehabilitation operations in the event of a Heat Wave –

S.	Department	Disaster Specific Action Plan
1	District Administration	• Issue necessary directions and ensure effective and coordinated response of all departments. • Make arrangements for compensation as per assessment.
2	PRI/ Local Administration	• Instruct all officials and staff up to *patwari, gramsevak, chowkidar, Asha sahyogini, anganwadi sevika,* etc. to forward updates to administration for grievance handling. • Arrange for meetings of local representatives, concerns. • Information dissemination and update public on Government interventions. • Promote and organize Hygiene and sanitation programmes.
3	Department of Information and Public Relation	• Publish/ issue IEC materials like bit notices, posters, jingles, radio/ TV programme on health, hygiene and sanitation issued for public awareness. • Issue periodic bulletins to media on Government interventions. • Ensure information given to media are facts and true to avoid rumours.
4	Department of Medical and Health	• Deployment of ambulances, additional medicines, mobile teams, life saving drugs, etc. • Allocate special wards in hospitals to serve patients affected by heat wave – flu, air and water borne/ washed communicable diseases. • Arrange for extra beds as required. • Prevention/ control of epidemics.

		• Health and epidemiology Surveillance • Monitor nutrition status of affected people and take appropriate actions.
5	Ayurved	• Assist and coordinate with medical department.
6	Animal Husbandry	• Treatment of affected animals. • Control of animal diseases.
7	Public Health Engineering Department	• Provide adequate water tankers, bleaching powder, new hand pump installation, hand pump repairs, sanitation blocks, etc. • Promote awareness on hygiene and sanitation.
8	Police	• Provide effective communication network • Deployment and monitoring of 108 ambulances in case of injured people • Maintenance of law and order.
9	NCC/ NYK and Scout	• Make Volunteers available • Help police in maintaining law and order situation.
10	Electricity	• Ensure regular supply of electricity.
11	Civil Supplies	• Make arrangement on supply of Ice, generators, etc.
12	Army	• Provide doctors, hospitals, vehicles and other rescue materials as aid to civil authorities.
13	Railways	• Adequate arrangement of special trains for transportation of affected people. • Make arrangements for water trains on demand from the administration.
14	Road Transport	• Make special arrangements as per the instructions from administration for transporting affected people to hospitals.
15	Department of Telecom	• Ensure proper communication network.
16	AIR/ DD &	• Publish/ issue IEC materials like bit notices, posters,

	other news channels	jingles, radio/ TV programme on health, hygiene and sanitation issues for public awareness. • Issue periodic bulletins to media on Government interventions.
17	UN, NGOs	• Support District/ Local administrations. • Raise awareness on Hygiene and Sanitation.

Chapter 21 - Cold Wave/ Frost – Disaster Action Plan

Probabilistic Scenario

Sever winter generating extreme cold and dry conditions causing deaths, crop loss, and health problems.

The following are the action plans for departments, agencies and stakeholders which shall be involved for immediate rescue, relief, response and rehabilitation operations in the event of a Cold Wave –

S. N	Department	Disaster Specific Action Plan
1	District Administration	• Issue necessary directions and ensure effective and coordinated response of all departments. • Make arrangements for compensation as per assessment.
2	PRI/ Local Administration	• Instruct all officials and staff up to *patwari, gramsevak, chowkidar, anganwadi sevika,* etc. to forward updates to administration for grievance handling. • Arrange for meetings of local representatives to hear their concerns. • Information dissemination and update public on Government interventions. • Promote and organize Hygiene and sanitation programmes.
3	Agriculture Department	• Arrange for the provision of crop losses due to the incident based on the *'Girdawari'* • Promote Crop insurance. • Correct assessment / identification of crop loss. • Arrange for improvised seeds, pest control, insurance facilities • Moral boosting
4	Department of Information and Public Relation	• Publish/ issue IEC materials like bit notices, posters, jingles, radio/ TV programme on health, hygiene and sanitation issued for public awareness. • Issue periodic bulletins to media on Government interventions.

		• Ensure information given to media are facts and true to avoid rumours.
5	Department of Medical and Health	• Deployment of ambulances, additional medicines, mobile teams, life saving drugs, blankets, warm clothing, etc. • Allocate special wards in hospitals to serve patients affected by cold wave – flu, air and water borne communicable diseases. • Arrange for extra beds as required. • Prevention/ control of epidemics. • Health and epidemiology Surveillance • Monitor nutrition status of affected people and take appropriate actions.
6	Ayurved	• Assist and coordinate with medical department.
7	Animal Husbandry	• Treatment of affected animals. • Control of animal diseases.
8	Municipal Corporations	• Arrange for temporary shelters (*ran baseras)* • Disposal of bodies of orphans, beggars who succumb to cold waves.
9	Police	• Provide effective communication network • Deployment and monitoring of 108 ambulances in case injured people • Maintenance of law and order.
10	NCC/ NYK and Scout	• Make Volunteers available • Help police in maintaining law and order situation.
11	Civil Supplies	• Make arrangements for supply of coal, fuel, wood, LGP gas, etc.
12	Army	• Provide doctors, hospitals, vehicles and other rescue materials as aid to civil authorities.
13	Railways	• Adequate arrangement of special trains for transportation of affected people.

14	Road Transport	• Make special arrangements as per the instructions from administration for transporting affected people to hospitals.
15	Department of Telecom	• Ensure proper communication network.
16	AIR/ DD & other news channels	• Issue periodic bulletins to media on Government interventions.
17	UN, NGOs	• Support District/ Local administrations. • Provide services to affected people – warm cloths, blankets, winterized tents, relief materials, etc.

Chapter 22 - Hail Storm– Disaster Action Plan

Probabilistic Scenario

A sudden and unexpected hailstorm resulting in deaths, destruction of agriculture crops, and properties in the region.

The following are the action plans for departments, agencies and stakeholders which shall be involved for immediate rescue, relief, response and rehabilitation operations in the event of a Hailstorm –

S. No	Department	Disaster Specific Action Plan
1	District/ Local Administration	• Constitute committee for assessment of the situation and loss and damage of life, properties, infrastructures, crops, etc. • As first responders, evaluate/ analyze the complete details of the incident/ situation and send detail report to higher authorities for effective decisions making. • Arrange for release of compensation based on the *'panchnama'*. • Ensure effective coordination with concerned departments, agencies, NGOs and stakeholders to quickly resolve the situation. • Generate daily report of relief/ response activities and disseminate. • Update political leaders/ issue periodic bulletins. • Media Management. • Make provisions for affected farmers to avail small loans from rural banks, Cooperative banks or National banks.
2	Agriculture Department	• Arrange for the provision of crop losses due to the incident based on the *'Girdawari'* • Promote Crop insurance. • Correct assessment / identification of crop loss. • Arrange for improvised seeds, pest control, insurance facilities • Moral boosting

3	Police	• Provide effective communication network • Deployment and monitoring of 108 ambulances in case people are injured. • Maintenance of law and order.
4	Animal Husbandry	• Treatment of animals. Carcass disposal, Animal insurance. • Inform/ promote people to bring their animals to the nearest veterinary hospital for vaccination. If required, arrange for mass vaccination camps, etc. • Control of animal diseases.
5	Telecom	• Restoration of damaged lines and networks.
6	Electricity Board	• Immediately shut down the supply of electricity in the area. • Restoration of damaged lines and network
7	Civil Supplies and Public Distribution System (PDS)	• Check status of all the godowns/ warehouses and PDS shops. • Distribution of dry rations, fuel, oil and lubricants, etc. as per the directions of the administration. • Take precautionary steps against hoarding and profit mongering and ensure normal price of commodities in the market.
8	FCI/ Warehouse	• Keep stock of food grains • Quick transportation/ distribution of food grains as per demand from administration.
9	Media	• Issue bulletin on a periodic basis. • Inform public on Government interventions.
10	PRO	• Nodal person to be designated as spokesperson for the Government. • Ensure information given to media are facts and true to avoid rumours. Arrange visits for local and foreign journalists in affected areas.
11	UN, NGOs	• Support Government in all interventions. • Work in collaboration with Government authorities

		and departments.
12	Insurance Companies	• Promote crop insurance.
13	Emergency Operation Centre (EOC)	• Issue directions to all authorities, officials, departments and agencies. • Brief the Disaster Management & Relief Commissioner periodically. • Brief/ Update the chief minister and cabinet about the situation.

Chapter 23 - Chemical Disaster – Action Plan

Probabilistic Scenario

a) On Occurrence of chemical explosion/ accident in factories during production, maintenance or disposal of chemicals.
b) An Occurrence of a Chemical accident in the hazardous waste generating unit due to lack of effective safety management systems or human error or other factors like occurrence of natural calamities such as earthquakes, floods, etc.
c) A Chemical accident due to transportation of hazardous material by road, rail pipe lines and other means.
d) A catastrophic fire incident took place on the evening of October 29, 2009, at IOC Terminal, Sanganer, Jaipur. A huge leak of the product took place as a jet of fluid from the 'hammer Blind Valve" vaporized and led to a massive explosion. The impact of this incident was felt up to around 2 kilometres from the site. The fire which followed the explosion soon spread to all other tanks and continued to rage for about 11 days. A total of 11 persons (six from IOC and five from outside) lost their life in this deadly incident.

The following are the action plans for departments, agencies and stakeholders which shall be involved for immediate rescue, relief, response and rehabilitation operations in the event of a chemical disaster –

S. No	Department	Disaster Specific Action Plan
1	Department of Industries (Chemicals, Factories & Boilers).	Pre Disaster: • Prepare public for chemical disaster without creating fear psychosis/ panic both at domestic and at state level. • To mitigate the causalities of human and livestock. • To ensure minimum damage to vital installations and buildings • To ensure site plans are vetted and all resources are in a state of readiness as per onsite planning. • Assessment and evaluation of existing risks. • Sensitize and build capacities of response and HAZMAT teams. • Ensure strict enforcement of regulations laid down to improve safety in transportation of hazardous substances. During Disaster:

		• On noticing fire/ explosions/ release of toxic gas/ spillage of hazardous liquid, etc. raise alarm. • Alert control room (about the place of incident) and EOC. • Manning of control room 24x7. • Assess details of safely measures required for rescue operations. • Carry out assessment of maximum storage of hazardous material at the incident site. • Alert/ caution all staff, officials, labourers at the site through loud speakers, mega phones, sirens, etc. • Search, Rescue and evacuate injured staff, people to safer places working in the industrial premises. • Provisions of HAZMAT and other specialists to be made during the disaster. • Assist all first responders, fire department, police, and specialist teams as required.
2	Municipal Corporation/ Fire Department	• <u>Pre Disaster:</u> • Adequacy of fire fighting agents/ control measures at each industrial location. • Work out mutual aid arrangements in the cluster. • <u>During Disaster:</u> • Organise reception centres at assembly points • Coordinate resources of voluntary organisations. • Mobilize all fire fighting units. • Use of special fire fighting agents and equipments for chemical emergencies. • Assist in evacuation, search and rescue operations. • Search, rescue and evacuate people to safer areas. • Deployment of fire vehicles, rescue equipments, ladders, water tankers for replenishment, tractors, cranes, gas cutters and other equipments like fire suits, masks, blankets, ropes, generator sets, etc., and also ensure adequate availability of labourers. • Make available all types of fire extinguishers,

		equipment, vehicles, etc.
3	District Administration	• Exercise overall control over the emergency, provide officials information and instructions to the public. • Announce the incident through loudspeakers, TV, radio, local cables, media, etc. • Coordinate all resource in the industrial area. • Coordinate and brief on the additional sources coming to the affected area. • Establish alternative control centre depending on wind directions. • Ensure designated protective centres/ hospitals/ food stock/ water which are adequately protected and available. • Inform public on do's and don'ts for human & livestock. • Media Management • Deploy latest technologies to get instant information about storage/ handling/ quantity of hazardous chemicals at the location. • Assessment of loss of men and material • Financial assistance as per norms • Issue periodic bulletins.
4	Police	• Assume command of incident and ensure security & law and order. • Demarcate entries and exits for rescue operation and proper traffic management. • Protect vital installations • Alert/ caution public especially residing near the site/plant about the emergency. • Evacuate people (on & off site) to safer location. • Take necessary actions to avoid rumours. • Provide effective communication network • Deployment and monitoring of 108 ambulances.
5	Department of Medical	• Deployment of adequate ambulances, mobile teams, stretchers, specialists, medicines, first aid kits,

	and Health	paramedics, etc. • Set up mobile first aid posts at assembly points. • Provide first aid to injured persons. • Medical supply of antidotes, special medicines and life saving drugs and techniques. • Carcasses, corpse disposal services. • Coordination with organisations like Red Cross. • Maintain continuous supply of medicines and emergency services till normalcy returns.
6	State Pollution Board	• Monitor extent and quantum of pollution during the crisis. • Assess and declare hazardous areas safe for reoccupation by population.
7	Transport Department	• Making alternate arrangements of vehicles and transport as per the demand of the administration
8	Telecom	• Ensure communication network • Restoration of lines
9	PWD	• Provide JCBs, Cranes, L&T and other rescue equipments
10	UN, NGOs	• Coordinate with and support the administration and health department in combating the situation. • Provide relief services and materials to the affected victims and people.
11	Emergency Operation Centre (EOC)	• Coordinate the rescue operation. • Issue directions to all concerned departments for quick emergency response. • Brief the Disaster Management & Relief Commissioner. • Brief media regularly about the situation.

Chapter 24 - Biological Disaster – Action Plan

Probabilistic Scenario

a) A widespread cholera, diarrhoeal episode in both rural and urban areas causing deaths especially among children (0-5 years of age) and which is beyond the capacity of local administration to respond.
b) Widespread arthropod-borne epidemics (e.g., dengue or Japanese encephalitis) or laptospiresis, Plague, Artificial Respiratory Infections (ARI) which are beyond the coping capacity of local administration.
c) A pandemic like H1N1, Anthrax, SARS, etc. which is beyond the coping capacity of local/ state administration.
d) Use of Biological agents like Brucellosis, q fever, viral Hemorrhagic fevers, viral encephalitides by terrorist organizations in a biological warfare scenario.
e) A widespread disease like Bird flu, blue tongue, Avian Influenza etc., causing deaths of domestic animals/ livestock.

The following are the action plans for departments, agencies and stakeholders which shall be involved for immediate rescue, relief, response and rehabilitation operations in the event of a biological disaster –

S. No	Department	Disaster Specific Action Plan
1	District Administration	• Exercise overall control over the emergency, provide officials information and instructions to the public. • Sensitise public through loudspeakers, TV, radio, local cables, media, etc. and issue periodic bulletins. • Coordinate and brief on additional resources coming to the affected area. • Inform public about the do's and don'ts for humans & livestock. • Media Management. • Assessment of loss of men and livestock. • Financial assistance as per norms
2	Municipal Corporation	• Organise reception centres at important points, check posts, etc. • Coordinate resources of voluntary organisations.
3	Department of Medical and Health	• Strengthen existing surveillance. • Deployment of adequate ambulances, mobile teams, medicines, paramedics, etc.

		• Deploy Quick Response Medical Teams (QRMTs) • Alert all local epidemiological laboratories to be in a state of readiness. • Set up mobile posts at various locations for checkups. • Quarantine the affected people. • Movement of Relief &Rehabilitation team to the target public notification, alert local epidemiological lab, immunization to high risk cases, penicillin to confirmed cases, care of skin abrasion. • Issue personal protection equipment • Provide immediate treatment to affected persons. • Medical supply of special medicines and life saving drugs. • Coordinate and Co-opt organisations like the Red Cross. • Maintain continuous supply of medicines and emergency services till normalcy is restored. • Coordinate with PHED for supply of safe drinking water, water quality monitoring, hygiene and sanitation. • Surveillance of contaminated water sources that are potential places for mosquito breeding and ensure spraying of medicines, foam, etc. to control vector borne diseases like malaria, dengue, etc. • Promoting and strengthening Primary Health Centres with network of paramedics and health volunteers to improve the capacity of surveillance and control of epidemics. • Establishing testing laboratories at appropriate locations to reduce the time taken for early diagnosis and subsequent warning.
4	Police	• Assume command of incident and ensure security & law and order. • Take necessary actions to avoid rumours. • Provide effective communication network

		• Deployment and monitoring of 108 ambulances. • Organise and arrange temporary check posts at entry points.
5	Ayurved	• Assist and coordinate with Medical department in the operation.
6	Animal Husbandry	• Strengthen existing surveillance. • Deployment of veterinary officers and disease surveillance teams. • Evacuate people and animals to safer locations. • Quarantine diseased animals and birds. • Treatment and vaccination of animals against contagious diseases. • Supply of feed ingredients at nominal cost from the Food Corporation of India. • Coordination with grass root level organizations like NGOs, CBOs, SHGs, etc. • Disposal of deceased animals and birds (poultry). • Arrangement of vehicles to be requisitioned for transport of affected animals. • Vaccination of animals and identification of campsites in the probable areas. • Tagging of animals. • Promotion of animal insurance.
7	PHED	• Ensure supply of safe drinking water, water quality monitoring and improved sanitation. • Distribute household water purification tablets, bleaching/ chlorine powder to all Gram Panchayats. • Promote awareness through IEC materials like bit notices, pamphlets, posters, wall paintings and through mass media on health and hygiene.
8	Transport Department	• Making alternate arrangements of vehicles and transport as per the demand of the administration. • Coordinate with police, Medical department for medical checkup at *Naka bandi* (check post), bus

		stands, railway stations, airports, etc.
9	Telecom	• Ensure communication network. • Restoration of lines.
10	UN, NGOs	• Coordinate with and support the administration and health department in combating the situation. • Provide relief services and materials to the affected victims and people.
11	Emergency Operation Centre (EOC)	• Coordinate the rescue operation. • Issue directions to all concerned departments for quick emergency response. • Brief the Disaster Management & Relief Commissioner. • Brief media regularly about the situation.

Government of Rajasthan

State Disaster Management Plan (SDMP)

Part 3: Review and Updation of Plans

Chapter 25 - Review and Updation of Plan

Preparation and Updation of Disaster Management Plan

The organizational structure suggested in the present Disaster Management Plan (DM Plan), will be based on following concepts:

- The Disaster Management Plan of the State shall be a public document. The DM Plan is the sum and substance of all the Horizontal and Vertical disaster management plans in the state. Horizontal plans include plans prepared by line departments such as Home, Food & Civil supplies, Agriculture, Health, Drinking water & sanitation, urban development, Building construction and rural development department along with Fire Service, Municipal Corporation,
- Plans will work only in the case when present organizational structure is responsible to its non-emergency duties i.e. if a job is done well everyday; it is best done by that organization during emergency.
- Crisis should be met at the lowest and most immediate level of government. Plans call for local response supplemented if necessary, by the next higher jurisdiction.
- Voluntary response and involvement of the private sector should be sought and emphasized. The emergency management partnership is important to all phases of natural and man-made disasters.
- Preparation of the DM Plan is the responsibility of the State Disaster Management Authority of the state. The first draft plan has been prepared and further scope of rectification and updation is necessitated.
- After each updation of the DM Plan, a version number shall be given serially. Copy of the updated document shall be circulated to each stakeholder of disaster management in the state.

Periodic Updation of State Disaster Management Plan

Disaster Management is dynamic. Ground realities, changing population and characteristics, evolving government mechanisms in handling disasters/ emergencies determine the effectiveness of the SDMP. The plan will be reviewed and updated periodically by the SDMA. The DM Act 2005 section 23(5) required the SDMP to be reviewed and updated annually.

To achieve a level of absolute preparedness and to meet disasters of any magnitude, intensity or force, sufficient and technology-driven Hazard, Risk and Vulnerability Assessment (HVRA) of the state will be undertaken. Based on the outcome of HVRA, the SDMP shall be reviewed and comprehensive revisions will be incorporated.

While the review and update of relevant sections of the plan will be carried out annually, comprehensive revisions to the plan will be done in every five year period. Given frequent shifting of key personnel, both at the state and district level, monthly updates on the contact information of key departments personnel will be integral to the plan updates. Similarly, updates of the inventory of equipments need to be part of quarterly updates of the SDMP.

Disaster Management Implementation Status Report

The implementation of SDMP at the District, block, municipal and gram panchayat levels shall be achieved by translating the mechanism identified in the plan on the ground. The administration at all levels and all departments, agencies and stakeholders shall identify their goals and objectives set out in the plan and shall prepare their own plan. The nodal officers nominated by each department are responsible for preparing the plan and ensuring that the actions are carried out as per the plan. An implementation status report will be prepared by the end of every financial year and a copy of which would be submitted to DM&R.

The extent of manpower used to mitigate disasters in all phases (pre, during and post), budget spent on these activities, training and other capacity building activities carried out, and technology and material resources acquired for preparedness and mitigation measures shall be clearly noted in the implementation status report. The Implementation status report prepared by the nodal officer shall have the approval of the head of the departments and be forwarded to the Relief secretary, DM&R. Based on the experience; all departments can review and update the plan on a yearly basis.

Post Disaster Evaluation Mechanism

Disasters are always unexpected. Each disaster causes huge loss of human lives and property. And every disaster repeats after a particular interval. Also lessons learnt from a particular disaster will help to plan for another potential hazard. In case of a disaster, the SEC shall make special arrangements to collect all concerned data on that particular disaster, irrespective of size and vulnerability. This post disaster evaluation mechanism shall be set up with qualified professionals, experts and researchers and the collected data shall be thoroughly crosschecked and documented in the Sate & District EOC for further reference. This document shall be prepared with proper attention, keeping in view of the Mitigation, Preparedness, Response, Recovery & Rehabilitation measures.

Consultation Mechanism

Consultative mechanisms among the key departments concerned with disaster management at the state level; consultation mechanism among civil society, NGOs, and training institutes in the state will form the basis of updates and revisions to the plan. The SDMA and SEC shall update the SDMP as the need and demand presents. Similarly, the DDMA shall update the DDMP as per the need and demand.

Time Frame for review and update of SDMP:

Activity	Year 1	Year 2	Year 3	Year 4	Year 5
Consultation with all departments and administration, NGOs, etc. to finalize the SDMP					
Undertake state-wide HRV assessment					
Prepare Implementation Status Report by all departments and administration at all levels.					
Review and monitor progress					
Comprehensive revision and update of SDMP					

Chapter 26 - Coordination and Implementation

Networking and coordination among the departments will lay a strong foundation in achieving the goal of mitigating disasters and managing them effectively. While networking specific to the state will incrementally evolve with active participation of government departments and other stakeholders, there are certain tools already available for ready use. The Indian Disaster Resource Network (IDRN) facilitates better coordination and networking among different states, departments and stakeholders. This is detailed in chapter 6 of the SDMP.

Co-ordination with Various departments and Agencies

The initial response to a disaster is usually provided by the emergency services supported by local authority, but many agencies can become involved. The emergency services will maintain a state of readiness so as to provide a rapid response and alert local authorities and other services at the earliest. All organizations that need to respond quickly to a disaster will have arrangements that can be activated at a very short notice. These arrangements shall be clearly established and promulgated.

Although involvement of different emergency services like Police, Fire Brigade and Hospital services is inevitable, some other Public Utility Services, such as local bodies, Railways, Air lines, etc., have to be involved also in most cases for dealing with the situation effectively. All such agencies are different organizations, with different hierarchies and chains of command and responsibility. If rescue and recovery work is to be effective, all these departments and agencies have to work together in a coordinated way. They therefore, have to be aware of each other's areas of responsibility and systems of working. Comprehensive discussion and agreement among these agencies in the planning stage and communication of these decisions to lower level functionaries, and of course their capacity enhancement, is of utmost importance. This would not only enable them to know about who is responsible for what, but also make them aware of their own roles and responsibility and can appreciate the need for Multi-Service Involvement in such a situation, avoiding duplication.

The SEC will coordinate all the activities related to Disaster Management at the State level. Similarly the DDMA will coordinate all the activities related to Disaster Management at the District level.

Establishing Vertical and Horizontal Linkages

Coordination, as between and amongst the various agencies involved in Disaster Management for ensuring implementation of the tasks entrusted to them is an important statutory responsibility of authorities at various levels.

The Disaster wise Action Plan of part 2 of the SDMP has been designed and drafted keeping in view the practicality, transparency in the realistic terms, sequence and requirement of a disaster situation. Therefore, this portion ensures vertical and

horizontal links and thus coordinates all the existing departments, agencies and stakeholder in the most effective manner.

However, it is pertinent to mention here that the process of coordination has to be a continuous process and is not limited to any particular situation but always should have a holistic view. Coordination efforts amongst various government departments and other stakeholders generates synergy and involves the bringing together of agencies and functionaries to ensure effective performance. Hence, minor alterations and customizations as per local conditions can always be handy for effective Disaster Management processes.

Annual Report

At the end of every financial year the DM&R will prepare and publish an annual report. The annual report will provide a full account of the activities of the DM&R during the previous year and will include the following –

- A statement of aims, objectives and vision of DM&R for Disaster Management
- Annual targets and achievement, in physical and financial terms, during the year to which the annual report pertains
- The activities implemented/ executed during the previous year.
- Plan for the next year.
- Any other information as deemed fits.

Institutionalizing Disaster Management Plan

All departments shall nominate a nodal officer who will be responsible for disaster management efforts from their respective departments. The nominated officers will prepare SOPs for their respective departments. The nodal officer shall also function as the first point of contact when the SDMP is activated and the EOC is operationalized.

Cross cutting government department and other stakeholder activities

Disaster considerably impacts all the sectors of development resulting in a serious social and economic setback of the overall physical and social development of the community. The process of development and the models of development choices made sometimes lead to disaster risks. There is a paradigm shift in an approach to disaster management in the country. The new approach proceeds from conventional approach that development cannot be sustainable unless disaster mitigation is built into the development process. The new policy also emanates from the belief that investment in mitigation is much more cost effective than expenditure on relief and rehabilitation.

Government line departments and service providing departments undertake several development programmes and execute projects in the districts, panchayats on regular basis. For instance, the Agriculture Department regularly conducts outreach programmes in educating farmers on best agricultural practices. Similarly the DM&R at the state level would coordinate and develop mechanisms where the information transferred to the farmers is disaster preparedness centric. This could

be done by training agriculture staff and frontline workers on Disaster Management. Therefore, these agriculture extension workers could effectively function as field ambassadors of disaster management. This concept is applicable for all the departments and capacity building plays a crucial role. Likewise, Irrigation and PWD departments regularly execute infrastructure improvement and development programmes. Streamlining disaster management into these regular programmes will help in better preparing to meet the emergency challenges.

Several NGOs, Corporate Social Responsibility (CSR) in the state have exclusive social development projects. The state shall reach out to these sectors within the state to impress on them in integrating disaster management efforts as core objectives of their social development projects and also involve them in the state sponsored capacity building initiatives.

Chapter 27 - Conclusions

The Disaster Management Plan provides an institutional mechanism for a quick and coordinated response for preventing disasters and also for initiating appropriate response activities in case of an event of a disaster. The Nodal Departments are expected to initiate action on their own, as per their SOPs, in the event of a disaster or a threat of a disaster and act promptly as per the directions from the higher authorities. In a disaster situation, a quick rescue and relief mission is essential. However, the ensuing damage can be minimized to a considerable extent if adequate preparedness and mitigation measures are taken up in a timely and proactive manner. Indeed, it has been noticed in the past, that as and when attention has been paid to adequate preparedness measures, the loss to life and property has been considerably reduced. Thus, the state will organize series of awareness campaigns and skill trainings at all levels thus ensuring a state of '*culture of preparedness'* and a '*Disaster resilient Rajasthan'*.

Government of Rajasthan

State Disaster Management Plan (SDMP)

Annexures

UNISDR Terminology on Disaster Risk Reduction (2009)

The UNISDR Terminology aims to promote common understanding and common usage of disaster risk reduction concepts and to assist the disaster risk reduction efforts of authorities, practitioners and the public. The previous version "Terminology: Basic terms of disaster risk reduction" was published in "Living with risk: a global review of disaster risk reduction initiatives" in 2004. The following year, the Hyogo Framework for Action 2005-2015 requested the UNISDR secretariat to "update and widely disseminate international standard terminology related to disaster risk reduction, at least in all official United Nations languages, for use in programme and institutions development, operations, research, training curricula and public information programmes".

The 2009 version is the result of a process of ongoing review by the UNISDR and consultations with a broad range of experts and practitioners in various international venues, regional discussions and national settings. The terms are now defined by a single sentence. The comments paragraph associated with each term is not part of the definition, but is provided to give additional context, qualification and explanation. It should be noted that the terms are not necessarily mutually exclusive, and in some cases may have overlapping meanings.

The Terminology has been revised to include words that are central to the contemporary understanding and evolving practice of disaster risk reduction but exclude words that have a common dictionary usage. Also included are a number of emerging new concepts that are not in widespread use but are of growing professional relevance; these terms are marked with a star (*) and their definition may evolve in future. The English version of the 2009 Terminology provides the basis for the preparation of other language versions. Comments and suggestions for future revisions are welcome and should be directed to the ISDR Secretariat isdr@un.org

Terminology	Meaning
Acceptable risk	The level of potential losses that a society or community considers acceptable given existing social, economic, political, cultural, technical and environmental conditions. Comment: In engineering terms, acceptable risk is also used to assess and define the structural and non-structural measures that are needed in order to reduce possible harm to people, property, services and systems to a chosen tolerated level, according to codes or "accepted practice" which are based on known probabilities of hazards and other factors.
Adaptation	The adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities.

	Comment: This definition addresses the concerns of climate change and is sourced from the secretariat of the United Nations Framework Convention on Climate Change (UNFCCC). The broader concept of adaptation also applies to non-climatic factors such as soil erosion or surface subsidence. Adaptation can occur in autonomous fashion, for example through market changes, or as a result of intentional adaptation policies and plans. Many disaster risk reduction measures can directly contribute to better adaptation.
Biological hazard	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. Comment: Examples of biological hazards include outbreaks of epidemic diseases, plant or animal contagion, insect or other animal plagues and infestations.
Building code	A set of ordinances or regulations and associated standards intended to control aspects of the design, construction, materials, alteration and occupancy of structures that are necessary to ensure human safety and welfare, including resistance to collapse and damage. Comment: Building codes can include both technical and functional standards. They should incorporate the lessons of international experience and should be tailored to national and local circumstances. A systematic regime of enforcement is a critical supporting requirement for effective implementation of building codes.
Capacity	The combination of all the strengths, attributes and resources available within a community, society or organization that can be used to achieve agreed goals. Comment: Capacity may include infrastructure and physical means, institutions, societal coping abilities, as well as human knowledge, skills and collective attributes such as social relationships, leadership and management. Capacity also may be described as capability. Capacity assessment is a term for the process by which the capacity of a group is reviewed against desired goals, and the capacity gaps are identified for further action.
Capacity Development	The process by which people, organizations and society

	systematically stimulate and develop their capacities over time to achieve social and economic goals, including through improvement of knowledge, skills, systems, and institutions. Comment: Capacity development is a concept that extends the term of capacity building to encompass all aspects of creating and sustaining capacity growth over time. It involves learning and various types of training, but also continuous efforts to develop institutions, political awareness, financial resources, technology systems, and the wider social and cultural enabling environment.
Climate change	(a) The Inter-governmental Panel on Climate Change (IPCC) defines climate change as: "a change in the state of the climate that can be identified (e.g., by using statistical tests) by changes in the mean and/or the variability of its properties, and that persists for an extended period, typically decades or longer. Climate change may be due to natural internal processes or external forcings or to persistent anthropogenic changes in the composition of the atmosphere or in land use". (b) The United Nations Framework Convention on Climate Change (UNFCCC) defines climate change as "a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods". Comment: For disaster risk reduction purposes, either of these definitions may be suitable, depending on the particular context. The UNFCCC definition is the more restricted one as it excludes climate changes attributable to natural causes. The IPCC definition can be paraphrased for popular communications as "A change in the climate that persists for decades or longer, arising from either natural causes or human activity."
Contingency planning	A management process that analyses specific potential events or emerging situations that might threaten society or the environment and establishes arrangements in advance to enable timely, effective and appropriate responses to such events and situations. Comment: Contingency planning results in organized and coordinated courses of action with clearly-identified institutional roles and resources, information processes, and operational arrangements for specific actors at times of need. Based on scenarios of possible emergency conditions or disaster events, it allows key actors to envision, anticipate and solve problems that can arise

	during crises. Contingency planning is an important part of overall preparedness. Contingency plans need to be regularly updated and exercised.
Coping capacity	The ability of people, organizations and systems, using available skills and resources, to face and manage adverse conditions, emergencies or disasters. Comment: The capacity to cope requires continuing awareness, resources and good management, both in normal times as well as during crises or adverse conditions. Coping capacities contribute to the reduction of disaster risks.
Corrective disaster risk management *	Management activities that address and seek to correct or reduce disaster risks which are already present. Comment: This concept aims to distinguish between the risks that are already present, and which need to be managed and reduced now, and the prospective risks that may develop in future if risk reduction policies are not put in place. See also Prospective risk management.
Critical facilities	The primary physical structures, technical facilities and systems which are socially, economically or operationally essential to the functioning of a society or community, both in routine circumstances and in the extreme circumstances of an emergency. Comment: Critical facilities are elements of the infrastructure that support essential services in a society. They include such things as transport systems, air and sea ports, electricity, water and communications systems, hospitals and health clinics, and centres for fire, police and public administration services.
Disaster	A serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses and impacts, which exceeds the ability of the affected community or society to cope using its own resources. Comment: Disasters are often described as a result of the combination of: the exposure to a hazard; 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, injury, 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.

Disaster risk	The potential disaster losses, in lives, health status, livelihoods, assets and services, which could occur to a particular community or a society over some specified future time period. Comment: The definition of disaster risk reflects the concept of disasters as the outcome of continuously present conditions of risk. Disaster risk comprises different types of potential losses which are often difficult to quantify. Nevertheless, with knowledge of the prevailing hazards and the patterns of population and socio-economic development, disaster risks can be assessed and mapped, in broad terms at least.
Disaster risk management	The systematic process of using administrative directives, organizations, and operational skills and capacities to implement strategies, policies and improved coping capacities in order to lessen the adverse impacts of hazards and the possibility of disaster. Comment: This term is an extension of the more general term "risk management" to address the specific issue of disaster risks. Disaster risk management aims to avoid, lessen or transfer the adverse effects of hazards through activities and measures for prevention, mitigation and preparedness.
Disaster risk reduction	The concept and practice of reducing disaster risks through 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. Comment: A comprehensive approach to reduce disaster risks is set out in the United Nations-endorsed Hyogo Framework for Action, adopted in 2005, whose expected outcome is "The substantial reduction of disaster losses, in lives and the social, economic and environmental assets of communities and countries." The International Strategy for Disaster Reduction (ISDR) system provides a vehicle for cooperation among Governments, organisations and civil society actors to assist in the implementation of the Framework. Note that while the term "disaster reduction" is sometimes used, the term "disaster risk reduction" provides a better recognition of the ongoing nature of disaster risks and the ongoing potential to reduce these risks.
Disaster risk reduction	A document prepared by an authority, sector, organization or

plan *	enterprise that sets out goals and specific objectives for reducing disaster risks together with related actions to accomplish these objectives. Comment: Disaster risk reduction plans should be guided by the Hyogo Framework and considered and coordinated within relevant development plans, resource allocations and programme activities. National level plans needs to be specific to each level of administrative responsibility and adapted to the different social and geographical circumstances that are present. The time frame and responsibilities for implementation and the sources of funding should be specified in the plan. Linkages to climate change adaptation plans should be made where possible.
Early warning system	The set of capacities needed to generate and disseminate timely and meaningful warning information to enable individuals, communities and organizations threatened by a hazard to prepare and to act appropriately and in sufficient time to reduce the possibility of harm or loss. Comment: This definition encompasses the range of factors necessary to achieve effective responses to warnings. A people-centred early warning system necessarily comprises four key elements: knowledge of the risks; monitoring, analysis and forecasting of the hazards; communication or dissemination of alerts and warnings; and local capabilities to respond to the warnings received. The expression “end-to-end warning system” is also used to emphasize that warning systems need to span all steps from hazard detection through to community response.
Ecosystem services	The benefits that people and communities obtain from ecosystems. Comment: This definition is drawn from the Millennium Ecosystem Assessment. The benefits that ecosystems can provide include “regulating services” such as regulation of floods, drought, land degradation and disease, along with “provisioning services” such as food and water, “supporting services” such as soil formation and nutrient cycling, and “cultural services” such as recreational, spiritual, religious and other non-material benefits. Integrated management of land, water and living resources that promotes conservation and sustainable use provide the basis for maintaining ecosystem services, including those that contribute to reduced disaster risks.

El Niño-Southern Oscillation phenomenon	A complex interaction of the tropical Pacific Ocean and the global atmosphere that results in irregularly occurring episodes of changed ocean and weather patterns in many parts of the world, often with significant impacts over many months, such as altered marine habitats, rainfall changes, floods, droughts, and changes in storm patterns. Comment: The El Niño part of the El Niño-Southern Oscillation (ENSO) phenomenon refers to the well-above-average ocean temperatures that occur along the coasts of Ecuador, Peru and northern Chile and across the eastern equatorial Pacific Ocean, while La Niña part refers to the opposite circumstances when well-below-average ocean temperatures occur. The Southern Oscillation refers to the accompanying changes in the global air pressure patterns that are associated with the changed weather patterns experienced in different parts of the world.
Emergency management	The organization and management of resources and responsibilities for addressing all aspects of emergencies, in particular preparedness, response and initial recovery steps. Comment: A crisis or emergency is a threatening condition that requires urgent action. Effective emergency action can avoid the escalation of an event into a disaster. Emergency management involves plans and institutional arrangements to engage and guide the efforts of government, non-government, voluntary and private agencies in comprehensive and coordinated ways to respond to the entire spectrum of emergency needs. The expression “disaster management” is sometimes used instead of emergency management.
Emergency services	The set of specialized agencies that have specific responsibilities and objectives in serving and protecting people and property in emergency situations. Comment: Emergency services include agencies such as civil protection authorities, police, fire, ambulance, paramedic and emergency medicine services, Red Cross and Red Crescent societies, and specialized emergency units of electricity, transportation, communications and other related services organizations.
Environmental degradation	The reduction of the capacity of the environment to meet social and ecological objectives and needs. Comment: Degradation of the environment can alter the frequency and intensity of natural hazards and increase

	the vulnerability of communities. The types of human-induced degradation are varied and include land misuse, soil erosion and loss, desertification, wild land fires, loss of biodiversity, deforestation, mangrove destruction, land, water and air pollution, climate change, sea level rise and ozone depletion.
Environmental impact assessment	Process by which the environmental consequences of a proposed project or programme are evaluated, undertaken as an integral part of planning and decision-making processes with a view to limiting or reducing the adverse impacts of the project or programme. Comment: Environmental impact assessment is a policy tool that provides evidence and analysis of environmental impacts of activities from conception to decision-making. It is utilized extensively in national programming and project approval processes and for international development assistance projects. Environmental impact assessments should include detailed risk assessments and provide alternatives, solutions or options to deal with identified problems.
Exposure	People, property, systems, or other elements present in hazard zones that are thereby subject to potential losses. Comment: Measures of exposure can include the number of people or types of assets in an area. These can be combined with the specific vulnerability of the exposed elements to any particular hazard to estimate the quantitative risks associated with that hazard in the area of interest.
Extensive risk *	The widespread risk associated with the exposure of dispersed populations to repeated or persistent hazard conditions of low or moderate intensity, often of a highly localized nature, which can lead to debilitating cumulative disaster impacts. Comment: Extensive risk is mainly a characteristic of rural areas and urban margins where communities are exposed to, and vulnerable to, recurring localised floods, landslides storms or drought. Extensive risk is often associated with poverty, urbanization and environmental degradation. See also “Intensive risk”.
Forecast	Definite statement or statistical estimate of the likely occurrence of a future event or conditions for a specific area. Comment: In meteorology a forecast refers to a future condition, whereas a warning refers to a potentially dangerous

	future condition.
Geological hazard	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. Comment: Geological hazards include internal earth processes, such as earthquakes, volcanic activity and emissions, and related geophysical processes such as mass movements, landslides, rockslides, surface collapses, and debris or mud flows. Hydro meteorological factors are important contributors to some of these processes. Tsunamis are difficult to categorize; although they are triggered by undersea earthquakes and other geological events, they are essentially an oceanic process that is manifested as a coastal water-related hazard.
Greenhouse gases	Gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and emit radiation of thermal infrared radiation emitted by the Earth's surface, the atmosphere itself, and by clouds. Comment: This is the definition of the Intergovernmental Panel on Climate Change (IPCC). The main greenhouse gases (GHG) are water vapour, carbon dioxide, nitrous oxide, methane and ozone.
Hazard	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. Comment: The hazards of concern to disaster risk reduction as stated in footnote 3 of the Hyogo Framework are "... hazards of natural origin and related environmental and technological hazards and risks." Such hazards arise from a variety of geological, meteorological, hydrological, oceanic, biological, and technological sources, sometimes acting in combination. In technical settings, hazards are described quantitatively by the likely frequency of occurrence of different intensities for different areas, as determined from historical data or scientific analysis. See other hazard-related terms in the Terminology: Biological hazard; Geological hazard; Hydro meteorological hazard; Natural hazard; Socio-natural hazard; Technological hazard.
Hydro meteorological hazard	Process or phenomenon of atmospheric, hydrological or oceanographic nature 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. Comment: Hydro meteorological hazards include tropical cyclones (also known as typhoons and hurricanes), thunderstorms, hailstorms, tornados, blizzards, heavy snowfall, avalanches, and coastal storm surges, floods including flash floods, drought, heat waves and cold spells. Hydro meteorological conditions also can be a factor in other hazards such as landslides, wild land fires, locust plagues, epidemics, and in the transport and dispersal of toxic substances and volcanic eruption material
Intensive risk *	The risk associated with the exposure of large concentrations of people and economic activities to intense hazard events, which can lead to potentially catastrophic disaster impacts involving high mortality and asset loss. Comment: Intensive risk is mainly a characteristic of large cities or densely populated areas that are not only exposed to intense hazards such as strong earthquakes, active volcanoes, heavy floods, tsunamis, or major storms but also have high levels of vulnerability to these hazards. See also “Extensive risk.”
Land-use planning	The process undertaken by public authorities to identify, evaluate and decide on different options for the use of land, including consideration of long term economic, social and environmental objectives and the implications for different communities and interest groups, and the subsequent formulation and promulgation of plans that describe the permitted or acceptable uses. Comment: Land-use planning is an important contributor to sustainable development. It involves studies and mapping; analysis of economic, environmental and hazard data; formulation of alternative land-use decisions; and design of long-range plans for different geographical and administrative scales. Land-use planning can help to mitigate disasters and reduce risks by discouraging settlements and construction of key installations in hazard-prone areas, including consideration of service routes for transport, power, water, sewage and other critical facilities.
Mitigation	The lessening or limitation of the adverse impacts of hazards and related disasters. Comment: The adverse impacts of hazards often cannot be prevented fully, but their scale or severity can be

	substantially lessened by various strategies and actions. Mitigation measures encompass engineering techniques and hazard-resistant construction as well as improved environmental policies and public awareness. It should be noted that in climate change policy, "mitigation" is defined differently, being the term used for the reduction of greenhouse gas emissions that are the source of climate change.
National platform for disaster risk reduction	A generic term for national mechanisms for coordination and policy guidance on disaster risk reduction that are multi-sectoral and inter-disciplinary in nature, with public, private and civil society participation involving all concerned entities within a country. Comment: This definition is derived from footnote 10 of the Hyogo Framework. Disaster risk reduction requires the knowledge, capacities and inputs of a wide range of sectors and organisations, including United Nations agencies present at the national level, as appropriate. Most sectors are affected directly or indirectly by disasters and many have specific responsibilities that impinge upon disaster risks. National platforms provide a means to enhance national action to reduce disaster risks, and they represent the national mechanism for the International Strategy for Disaster Reduction.
Natural hazard	Natural 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. Comment: Natural hazards are a sub-set of all hazards. The term is used to describe actual hazard events as well as the latent hazard conditions that may give rise to future events. Natural hazard events can be characterized by their magnitude or intensity, speed of onset, duration, and area of extent. For example, earthquakes have short durations and usually affect a relatively small region, whereas droughts are slow to develop and fade away and often affect large regions. In some cases hazards may be coupled, as in the flood caused by a hurricane or the tsunami that is created by an earthquake.
Preparedness	The knowledge and capacities developed by governments, professional response and recovery organizations, communities and individuals to effectively anticipate, respond to, and recover from, the impacts of likely, imminent or current hazard events or conditions. Comment: 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 through 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, 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 quickly and appropriately respond when required.
Prevention	The outright avoidance of adverse impacts of hazards and related disasters. Comment: Prevention (i.e. disaster prevention) expresses the concept and intention to completely avoid potential adverse impacts through action taken in advance. Examples include dams or embankments that eliminate flood risks, land-use regulations that do not permit any settlement in high risk zones, and seismic engineering designs that ensure the survival and function of a critical building in any likely earthquake. Very often the complete avoidance of losses is not feasible and the task transforms to that of mitigation. Partly for this reason, the terms prevention and mitigation are sometimes used interchangeably in casual use.
Prospective disaster risk management *	Management activities that address and seek to avoid the development of new or increased disaster risks. Comment: This concept focuses on addressing risks that may develop in future if risk reduction policies are not put in place, rather than on the risks that are already present and which can be managed and reduced now. See also Corrective disaster risk management.
Public awareness	The extent of common knowledge about disaster risks, the factors that lead to disasters and the actions that can be taken individually and collectively to reduce exposure and vulnerability to hazards. Comment: Public awareness is a key factor in effective disaster risk reduction. Its development is pursued, for example, through the development and dissemination of information through media and educational channels, the establishment of information centres, networks, and community or participation actions, and advocacy by

	senior public officials and community leaders.
Recovery	The restoration, and improvement where appropriate, of facilities, livelihoods and living conditions of disaster-affected communities, including efforts to reduce disaster risk factors. Comment: The recovery task of rehabilitation and reconstruction begins soon after the emergency phase has ended, and should be based on pre-existing strategies and policies that facilitate clear institutional responsibilities for recovery action and enable public participation. Recovery programmes, coupled with the heightened public awareness and engagement after a disaster, afford a valuable opportunity to develop and implement disaster risk reduction measures and to apply the "build back better" principle.
Residual risk	The risk that remains in unmanaged form, even when effective disaster risk reduction measures are in place, and for which emergency response and recovery capacities must be maintained. Comment: The presence of residual risk implies a continuing need to develop and support effective capacities for emergency services, preparedness, response and recovery together with socio-economic policies such as safety nets and risk transfer mechanisms.
Resilience	The ability of a system, community or society exposed to hazards to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions. Comment: Resilience means the ability to "resale from" or "spring back from" a shock. The resilience of a community in respect to potential hazard events is determined by the degree to which the community has the necessary resources and is capable of organizing itself both prior to and during times of need.
Response	The provision of emergency services and public assistance during or immediately after a disaster in order to save lives, reduce health impacts, ensure public safety and meet the basic subsistence needs of the people affected. Comment: Disaster response is predominantly focused on immediate and short-term needs and is sometimes called "disaster relief". The division between this 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.
Retrofitting	Reinforcement or upgrading of existing structures to become more resistant and resilient to the damaging effects of hazards. Comment: Retrofitting requires consideration of the design and function of the structure, the stresses that the structure may be subject to from particular hazards or hazard scenarios, and the practicality and costs of different retrofitting options. Examples of retrofitting include adding bracing to stiffen walls, reinforcing pillars, adding steel ties between walls and roofs, installing shutters on windows, and improving the protection of important facilities and equipment.
Risk	The combination of the probability of an event and its negative consequences. Comment: This definition closely follows the definition of the ISO/IEC Guide 73. The word "risk" has two distinctive connotations: in popular usage the emphasis is usually placed on the concept of chance or possibility, such as in "the risk of an accident"; whereas in technical settings the emphasis is usually placed on the consequences, in terms of "potential losses" for some particular cause, place and period. It can be noted that people do not necessarily share the same perceptions of the significance and underlying causes of different risks. See other risk-related terms in the Terminology: Acceptable risk; Corrective disaster risk management; Disaster risk; Disaster risk management; Disaster risk reduction; Disaster risk reduction plans; Extensive risk; Intensive risk; Prospective disaster risk management; Residual risk; Risk assessment; Risk management; Risk transfer.
Risk assessment	A methodology to determine the nature and extent of risk by analysing potential hazards and evaluating existing conditions of vulnerability that together could potentially harm exposed people, property, services, livelihoods and the environment on which they depend. Comment: Risk assessments (and associated risk mapping) include: a review of the technical characteristics of hazards such as their location, intensity, frequency and probability; the analysis of exposure and vulnerability including the physical social, health, economic and environmental dimensions; and the evaluation of the

	effectiveness of prevailing and alternative coping capacities in respect to likely risk scenarios. This series of activities is sometimes known as a risk analysis process.
Risk management	The systematic approach and practice of managing uncertainty to minimize potential harm and loss. Comment: Risk management comprises risk assessment and analysis, and the implementation of strategies and specific actions to control, reduce and transfer risks. It is widely practiced by organizations to minimise risk in investment decisions and to address operational risks such as those of business disruption, production failure, environmental damage, social impacts and damage from fire and natural hazards. Risk management is a core issue for sectors such as water supply, energy and agriculture whose production is directly affected by extremes of weather and climate.
Risk transfer	The process of formally or informally shifting the financial consequences of particular risks from one party to another whereby a household, community, enterprise or state authority will obtain resources from the other party after a disaster occurs, in exchange for ongoing or compensatory social or financial benefits provided to that other party. Comment: Insurance is a well-known form of risk transfer, where coverage of a risk is obtained from an insurer in exchange for ongoing premiums paid to the insurer. Risk transfer can occur informally within family and community networks where there are reciprocal expectations of mutual aid by means of gifts or credit, as well as formally where governments, insurers, multi-lateral banks and other large risk-bearing entities establish mechanisms to help cope with losses in major events. Such mechanisms include insurance and re-insurance contracts, catastrophe bonds, contingent credit facilities and reserve funds, where the costs are covered by premiums, investor contributions, interest rates and past savings, respectively.
Socio-natural hazard *	The phenomenon of increased occurrence of certain geophysical and hydro meteorological hazard events, such as landslides, flooding, land subsidence and drought, that arise from the interaction of natural hazards with overexploited or degraded land and environmental resources. Comment: This term is used for the circumstances where

	human activity is increasing the occurrence of certain hazards beyond their natural probabilities. Evidence points to a growing disaster burden from such hazards. Socio-natural hazards can be reduced and avoided through wise management of land and environmental resources.
Structural and non-structural measures	Structural measures: Any physical construction to reduce or avoid possible impacts of hazards, or application of engineering techniques to achieve hazard-resistance and resilience in structures or systems;
	Non-structural measures: Any measure not involving physical construction that uses knowledge, practice or agreement to reduce risks and impacts, in particular through policies and laws, public awareness raising, training and education. Comment: Common structural measures for disaster risk reduction include dams, flood levies, ocean wave barriers, earthquake-resistant construction, and evacuation shelters. Common non-structural measures include building codes, land use planning laws and their enforcement, research and assessment, information resources, and public awareness programmes. Note that in civil and structural engineering, the term "structural" is used in a more restricted sense to mean just the load-bearing structure, with other parts such as wall cladding and interior fittings being termed non-structural.
Sustainable development	Development that meets the needs of the present without compromising the ability of future generations to meet their own needs. Comment: This definition coined by the 1987 Brundtland Commission is very succinct but it leaves unanswered many questions regarding the meaning of the word development and the social, economic and environmental processes involved. Disaster risk is associated with unsustainable elements of development such as environmental degradation, while conversely disaster risk reduction can contribute to the achievement of sustainable development, through reduced losses and improved development practices.
Technological hazard	A hazard originating from technological or industrial conditions, including accidents, dangerous procedures, infrastructure failures or specific human activities, 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. Comment: Examples of technological hazards include industrial pollution, nuclear radiation, toxic wastes, dam failures, transport accidents, factory explosions, fires, and chemical spills. Technological hazards also may arise directly as a result of the impacts of a natural hazard event.
Vulnerability	The characteristics and circumstances of a community, system or asset that make it susceptible to the damaging effects of a hazard. Comment: There are many aspects of vulnerability, arising from various physical, social, economic, and environmental factors. Examples may include poor design and construction of buildings, inadequate protection of assets, lack of public information and awareness, limited official recognition of risks and preparedness measures, and disregard for wise environmental management. Vulnerability varies significantly within a community and over time. This definition identifies vulnerability as a characteristic of the element of interest (community, system or asset) which is independent of its exposure. However, in common use the word is often used more broadly to include the element's exposure.

HFA and their Compliance in SDMP Rajasthan

There has been international acknowledgement to systematically integrate efforts to reduce disaster risks into policies, plans and programmes for sustainable development and poverty reduction. Sustainable development, poverty reduction, good governance and disaster risk reduction are mutually supportive objectives, and in order to meet the challenges ahead, accelerated efforts must be made to build the necessary capacities at the community and national levels to manage and reduce risk.

Hyogo Framework for Action (HFA), declared at the World Conference on Disaster Reduction, held at Kobe, in 2005, encompasses disasters caused by hazards of natural origin and related environmental and technological hazards and risks. It thus reflects a holistic and multi-hazard approach to disaster risk management and the relationship between them which can have a significant impact on social, economic, cultural and environmental systems, has stressed as an approach, recognized as an important element for the achievement of internationally agreed development goals, including those contained in the Millennium Development Goals (MDGs).

In Hyogo Framework of Action (HFA), all 168 member countries, including India, agreed to fulfill the basic tenets which are:

1. Ensure that disaster risk reduction is a national and a local priority with a strong institutional basis for implementation
2. Identify, assess and monitor disaster risks and enhance early warning
3. Use knowledge, innovation and education to build a culture of safety and resilience at all levels
4. Reduce the underlying risk factors
5. Strengthen disaster preparedness for effective response at all levels

This Framework has certain laid down policies adopted by 168 member countries with a clear expected outcome-substantial reduction in disaster losses socially, economically and environmentally for the community. In 2005, Government of India passed the Disaster Management Act and the National Disaster Management Authority was set up under the chairmanship of the Prime- Minister. It has been made mandatory for all the states in the country to draw their respective Disaster Plans for better preparedness.

To fulfill the principles of HFA and the obligation of the Disaster Management Act 2005, Rajasthan, the largest state of the country, is streamlining its disaster management preparedness and mitigation strategy by drawing its own plan, keeping in view the unique requirements of the state and addressing its own issues with a hands-on user friendly approach.The State Disaster Management Plan (SDMP), Rajasthan provides a broad framework to the concerned departments and clearly delineates their roles and responsibilities in adhering to the HFA declaration.

The HFA priority areas and their status as well as compliance in the SDMP Rajasthan have been indicated in the matrix below.

Priority Actions	**Status and Inputs State**	**Compliance in SDMPRajasthan (Ref)**
Priority Action1: Ensure that disaster risk reduction is a national and a local priority with a strong institutional basis for implementation:		
1) Composition of State Executive Committee (SEC) and numbers of time State Executive Committee (SEC) met and key decision and recommendation that has been made for Disaster Risk Reduction (DRR)?	SEC constituted on 15 Oct 2007. Chief Secretary – Chairperson ACS (Dev) – Member Pr Secy. (Home) – Member Pr Secy. (Finance) – Member Secy. (DM &R) – Member Secy.	Chapter -1, Pg-15/16
2) Indicate the status of DDMAs and its operationalization in your State? Is there any challenge(s)?	DDMAs are institutionalized. Lack of exclusive manpower is the challenge.	Chapter -1, Pg-16
3) Are the elected representative at the State, District, Panchayat and Urban local Body level sensitized about their roles and responsibilities towards disaster preparedness, response and integration of DRR into development planning?	Being sensitized through the Capacity Building programme under 13th FC	Chapter -1, Pg-16 Chapter -7, Pg-112
4) How far Panchayat Raj Institutions have been involved in Disaster Management at the local level? Is there any statutory provision in your Panchayati Raj Act which devolves power to Panchayats to carry out Disaster Management?	PRIs are being involved in the orientation, response operations and development of Panchayat DM plans.	Chapter -1, Pg-16 Chapter -7, Pg-112
5) What is the status of Disaster Response Fund and Disaster Mitigation fund at State and district level?	SDRF is functional. No exclusive mitigation funds provided by GoI.	Chapter -10, Pg-149
6) How far the City Development plan takes into account the disaster preparedness and response planning.	Urban Development Department caters to the requirement of disaster preparedness and response planning.	Chapter -4
7) Status of State Disaster Response Force	50 each RAPs are in place at Kota,	Chapter – 6, Pg-

and building capacities for multi-disaster approach?	Jodhpur and Jaipur under SDRF and are being trained. Being provisioned for 200 RAPs each at all 7 divisions.	97
Priority Action2: **Identify, assess and monitor disaster risks and enhance early warning**		
1) Has there been any risk assessment study carried out for the entire State?	Done as a part of the SDMP, but no exclusive study on HRVA of the State has been done.	Chapter -3
2) Does the State have a disaster database, if yes indicate the period?	Yes, ref to IDRN. Needs regular up-dation.	IDRN, Pg-258
3) Share some specific incidences where the interface of the Master Plans or the Area Development Plans prepared with the hazard risk profile of the State can be clearly noticed?	Fire at ammunition depot in Bharatpur. No other incidence reported as yet.	...
4) What is the existing status of the early warning mechanisms in the State? How does the administration disseminate the early warning from State to the local level?	Weather watch group (for rains), and IMD with the help of Doppler radars for all weather related issues. Disseminated through SDMA and DDMAs, EOCs, departmental network,	Chapter-6, Pg-92
5) Indicate steps contemplated to strengthen the existing early warning mechanisms and formalize the information sharing mechanisms with the nodal agencies as identified by government of India for dissemination of early warning?	Satellite phone, Doppler Radars, internets, toll free telephone numbers, departmental network	Chapter - 6
6) Indicate steps taken to build up community based early warning dissemination system like community radio or community based early warning teams constitution at the village level etc.?	Ongoing orientation and capacity buildings programs at community levels by NDRF, SDMA, DDMAs, SHGs, NGOs.	Chapter -6
Priority Action 3: Use knowledge innovation and education to build a culture of safety and resilience at all levels		
1) Is Disaster Management a part of the school curriculum? If so in which	Yes, Standard VIII	Chapter -7

standards and for how long?		
2) Enumerate efforts put in as co-curricular activities to build in a culture of disaster resilience among the students? Is DM a part of higher education curriculum like engineering, architecture and other undergraduate courses?	Yes, Rajasthan Technical University has included Disaster Management & Environment Engineering in 2nd Semester course.	Chapter -7
3) What role department of education in the State has played to ensure safe environment in the schools at the State?	Taking up School Safety programmes in two districts of Alwar and Bikaner. Included DM in school text books.	Chapter -7
4) How many formal training programmes for the teachers in the State on school safety and disaster management organised?	Not yet formally organised.	Chapter -7
5) Share the efforts initiated to develop State specific tools and methodology for risk assessments? (Knowledge building require extensive research and a good understanding of hazard risks and vulnerability)	Study on drought prone cropping pattern, water harvesting structures, HVRA of Jaipur district, etc. are being undertaken.	Chapter -3
Priority Action 4: Reduce the underlying risk factors		
1) How far Disaster Risk Reduction (DRR) has been integrated into the development plans in the State? Does the District Development Plan integrate DRR while designing development schemes?	Being done, not yet fully incorporated.	Chapter -5
2) Does the State environment policy and the State Environment Act provide suitable measures to ensure sustainable natural resource management, land use planning and adaptation to climate change?	Yes	Chapter -4, Pg-56 Chapter -9 (Env+ Eco)
3) How far the State Government has been successful in ensuring construction of hazard resistant houses (both public and private) and restricting development of settlements in	Compliance to this effect is being ensured. Not yet fully accomplished.	Chapter-4

flood/cyclone/landslide prone areas?		
4) What is the status of amendment of building byelaws in the State to ensure structural safety and how far the rules are being complied? What are the existing challenges?	State Commission on Urbanization has been framed. The Building Bye Law is being reviewed for amendments.	Chapter -4, Pg-66
5) How far MGNREGA scheme is successful in the State?	Satisfactory	Chapter -4, 5
6) What is the success of JNNURM in the State and whether the State has taken any special measure to ensure that all construction under JNNURM are hazard resistant?	Satisfactory	Chapter -4, 5
7) How far the State has been able to incorporate Hazard Resistant Construction in the IAY scheme or any other State run housing scheme for Poor's?	Satisfactory	Chapter -4,5
8) Any retrofitting project implemented to reinforce the critical infrastructures in the State	Retrofitting clinic has been set up at Jodhpur.	Chapter-4, Pg-58
Priority Action 5: Strengthen disaster preparedness for effective response at all levels		
1) What kind of contingency planning is in place to minimize the impact of disasters? Has the State prepared their State Disaster Management Plan?	Yes, the SDMP is being finalized.	
2) Does the State have hazard specific disaster management plan?	Yes, a part of SDMP	Part-2, SDMP
3) Is there contingency financial reserve exists at the State level to respond to such events apart from the State Disaster Response Fund (SDRF)?	Yes	Chapter-10
4) Has there been any training imparted to the Anganwadi workers, health workers and self help groups on disaster preparedness?	Yes, being imparted under DRR	Chapter - 7
5) What is the existing condition of the other emergency service providers in the	Quite effective	Chapter -7

State like Police, Fire and Health?		
6) What are the major challenges faced by State in integrating DRR into the overall development planning? What steps the State has taken till date to integrate DRR into the ongoing development schemes in the State?	Inter departmental comprehensive coordination. Consultation with various departments and collectors being under taken.	Chapter -5
7) How far the 10% of the SDRF fund utilized for procurement of Search & Rescue (S&R) equipments and training specifically during the current year as per the recent revised SDRF norms 2010?	Already done.	Chapter -10

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