



GOVERNMENT OF HIMACHAL PRADESH

**HIMACHAL PRADESH
STATE DISASTER MANAGEMENT PLAN
2012**

**DISASTER MANAGEMENT CELL,
DEPARTMENT OF REVENUE**



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FOREWORD

The state of Himachal Pradesh is prone to various types of disasters. Of the total 33 hazards identified by HPC the State is vulnerable to 25 hazards. Every year the state faces the fury of nature in the form of perils caused by the vagaries of nature and aggravated by the intervention of human beings causing havoc to life and property. It is ironical that the poor and weaker sections of society who have the least capacity to cope with the situation are the worst affected.

The threat of an impending earthquake in the state hangs like the proverbial Damocles sword over the large numbers who live in the highest risk zone V as per the seismic zoning map of India. Over 70% of the people of the state are agrarian and very much dependent on the seasonal rainfall and changing climatic conditions. Erratic rainfall and weather conditions cause frequent flash floods in the catchments of the major drainage systems of the state causing extensive damage to property and life.

Vulnerability to natural disasters coupled with socio economic vulnerability of people underscores the need for evolving a comprehensive plan for disaster management. Traditionally communities have accepted disasters as acts of God and lived with them. With the advent of modern technologies it has now become possible to manage a disaster at various stages using knowledge products and techniques available to us to predict and mitigate the impact. Preparation of plan, identification of roles and responsibilities of key stakeholders is an important step in this direction. The implementation of policy, rules, guidelines and available tools and techniques will go a long way in reducing the risks and vulnerability of people and critical infrastructure in the state. In order to ensure disaster mitigation we need to mainstream sustainable development by incorporating vulnerability reduction as part of the planning process. The State Disaster Management Plan envisages using the available resources in all phases of disaster management, while addressing the multidimensional and multi sectoral aspects of disasters and the differing with varying vulnerability across the state.

While the existing command and operation centric institutional mechanism is very effective and robust for carrying out response, relief, rehabilitation, the plan recognizes the need to reorient it to address the whole gamut of disaster management issues like prevention, mitigation, response, relief, rehabilitation and reconstruction. The plan also attempts to put in place a coordinated, comprehensive and management centric response system with the active participation of community and by delineating proper sequence of actions at various stages of disaster management.

I am sure that the availability of this plan will strengthen and facilitate proactive action on all phases of disaster management as it provides necessary direction and guidance for different stakeholders including victims of the disaster.

I hope that this effort of the SEC will usher in a new era of enhanced capacities for managing disasters risks and in generating necessary knowledge, skills, resources, motivation, attitude and accountability that will help in evolving a culture of prevention and preparedness and mitigating the impact of all possible hazards.

(SUDRIPTA ROY)
Chief Secretary cum Chairman,
State Executive Committee
Cum CEO State Disaster Management Authority
Govt. of Himachal Pradesh

ACKNOWLEDGEMENT

The first draft of this plan was prepared by SEEDS in Consultation with all stakeholders including Department of Revenue. The draft was revised and reformatted by the Revenue Department by reassessing the vulnerability risks and district specific peculiarities. The contributions of SEEDS in preparing the first draft document are highly appreciated. The comments and inputs provided by concerned Departments have also helped in preparing this plan. We would like to place on record the appreciation to all who have contributed directly or indirectly in the preparing this plan. The contributions of Shri Dinesh Malhotra, Director HIPA, Dr. R.K. Sood as Advisor cum Consultant and Shri D.C. Rana as State Project Officer UNDP in compiling, upgrading and revising the draft are highly appreciable. Shri Navneet Yadav (United Nations Volunteer) and Shri Sachin Chauhan (Project Associate- I.T.) have helped in the layout design and formatting of this DOCUMENT.

(GOPAL CHAND)
Additional Secretary (Revenue) to the
Government of Himachal Pradesh,
Disaster Management Cell
(Department of Revenue)

PREFACE

The Disaster Management Act, 2005 stipulates every state in India to prepare its own disaster management plan aimed at reducing potential loss of life and property in disasters as well as ensuring strong preparedness, response, relief and rehabilitation measures for coping with disasters.

This Plan has been prepared as per the guidelines provided by the National Disaster Management Authority and based on existing hazard vulnerability and risk perception of the various stakeholders. The roles and functions to be played by the different organs of institutional mechanism have been defined taking into consideration the specificities of the state. Disaster management, by its very nature, requires a multi-disciplinary approach hence a strong coordination mechanism forms the core of successful Disaster Management. This Plan outlines the functions of the principal Agencies like SDMA, SEC, State Relief Commissioner, and DDMA. The Himachal Pradesh State Disaster Management Authority (HP SDMA) and SEC is supported by the line departments. However the functions identified for each line department are mandatory and each line department and DDMA are required to prepare their own disaster management plans in conformity with the State Plan.

The present plan is an outcome of the information assimilated from various secondary sources as the systematic data on the HVRA for the State is being compiled as yet. The process for evolving a comprehensive HVRA in the form of an Atlas has been initiated. This Plan will be reviewed annually by the SEC to ensure all activities and information is updated using the HVRA Atlas that will be ready by the end of 2013. Regular training of all stakeholders and specially the officials would be carried out to ensure compliance and quick response during disaster situations. In order to identify the training requirements and to assess the present status of knowledge, attitude and prevailing practices, TNA of all stakeholders has been conducted and KAP studies have also been initiated so that training and awareness programmes are more focused and result-oriented.

The Plan has been structured for easy understanding and clear demarcation of roles and responsibilities for scenarios before, during and after disasters. Past experience has shown that each disaster situation throws up a new set of challenges which the government has to deal with. It is therefore impractical to go to each spectrum in anticipating every possible situation. The Plan adopts a comprehensive approach to prepare the State Machinery to tackle any Disaster like situation i.e. Earthquake Landslides, Drought, Floods/Flash floods, Cloud burst, Dam Burst, Forest fire, Urban and Rural Fire, stampede etc.

It is hoped that the Plan serves the purpose for which it is designed, to ensure safety and well being of the citizens of Himachal Pradesh.

(DEEPAK SANAN)
Relief Commissioner cum
Additional Chief Secretary (Revenue) to the
Government of Himachal Pradesh

Bird’s Eye view of the Plan

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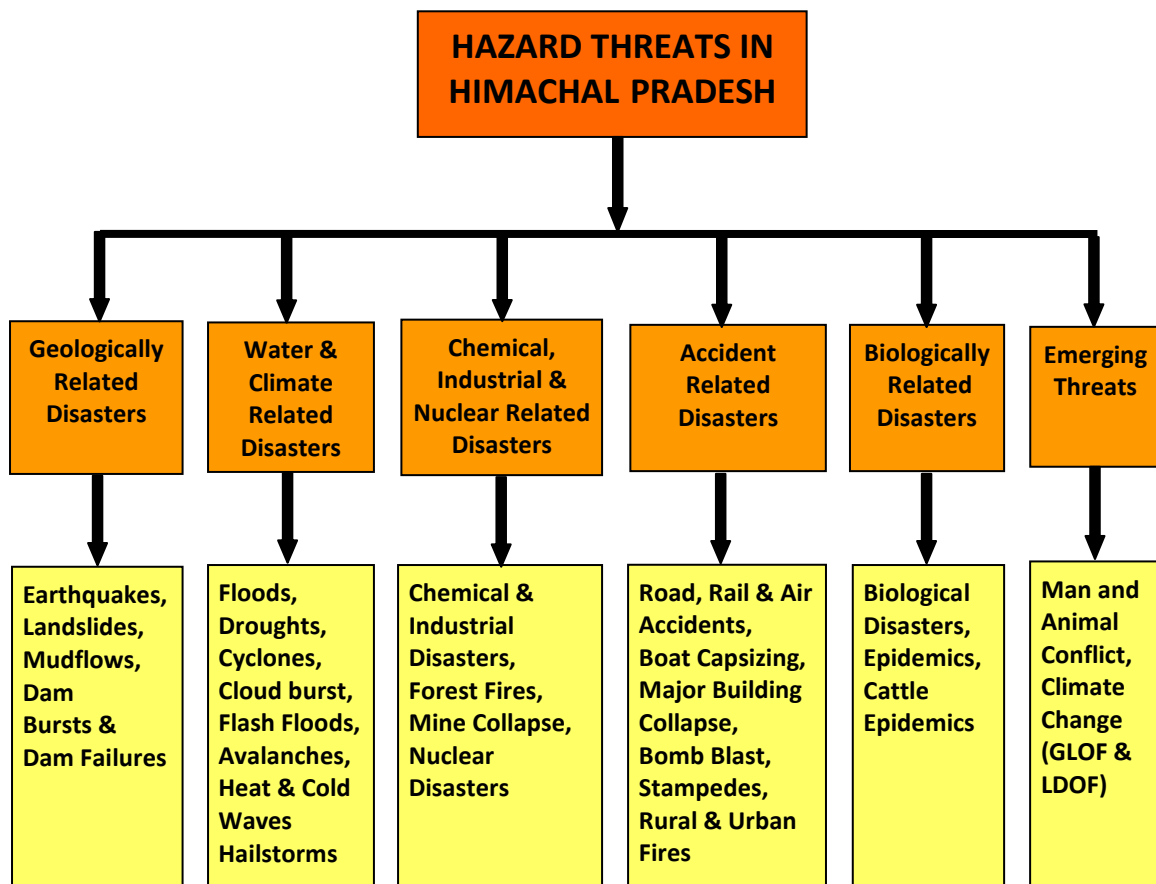
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**Bird's eye view of the
H. P. State Disaster Management Plan, 2012**

SNAP SHOT OF DISASTER MANAGEMENT IN HIMACHAL PRADESH

PHYSICAL & SOCIO-ECONOMIC FACTS

Total Geographical Area	55673 sq. kms.
Annual rainfall	149 cm
Administration Divisions	3
Districts	12
CD Blocks	77
Tehsil/Sub-Tehsils	117
Cities & Towns	59
Total Villages	20,960
Population	68,56,509
Literacy	83.8%
Population Density	123
No. of Schools (Primary to Hr. Sec.)	15,147
No. of Hospitals	95
CHC	77
PHC	453
Beds Available (Including Ayurvedic Hospitals)	9959
Registered Factories	3949
Total Road length	33,722 kms.
Total Railway line length	242 kms.
Total Potential installed capacity of electricity By HPSEB	467.083 MW



Roles and responsibilities of the ESF

ESF	Responsibilities
Communication	Department of IT will ensure the provision of state wide telecommunication ,communication and other Network services to the state, and districts in response efforts
Public Health and Sanitation	Department of health & family welfare will provide coordinated assistance in response to public health and medical care needs following any natural or manmade disaster.
Power	Department of power through HPSEB facilitate restoration of energy systems in any disaster and maintain their functioning.
Transport	Department of Transport through HRTC will provide transport support. Coordinate the use of both Govt. & Private resources. Support Forces requiring transportation to perform their emergency response, recovery and assistance for any other activity.
Search and Rescue	Department of home through Police, Home Guard & Fire Brigade will provide specialized life saving assistance to district and local authorities In locating, extricating and providing on site medical treatment to victims trapped in collapsed structures.
Donations	Department of Revenue will ensure donation management to control the flow of goods and services into a disaster area.
Public works and Engineering	Department of public works & Irrigation Public Health will provides technical advice and technical services in repairing facilities and engineering infrastructure, contracting for construction management, inspection, and

	emergency repair. Provide for potable water, assist in restoring life sustaining actions, damage mitigation and recovery. Perform immediate damage assessment of physical infrastructure.
Information and Planning	Department of Public relation & Environment Science & Technology will collect, process and disseminate information about an actual or potential situation. To facilitate the overall activities of all responders in providing assistance to an effected area, shall maintain a data base of disaster related information in GIS format to allow easy access and retrieval during a disaster.
Relief supplies	Department of Revenue through district administration will coordinate activities involved with emergency provisions of temporary shelters, emergency mass feeding, and bulk distribution of coordinated relief supplies for victims of disasters
Food	Department of Food & Civil Supplies will identify the basic needs of food in the aftermath of a disaster or emergency. Procure appropriate supplies. Store at secured places and arrange to transport food assistance to the affected areas and authorize food stamp assistance.
Drinking water	Department of irrigation public health will ensure and provide a minimum quantity of clean drinking water and check the spread of any potential disease during disaster. Undertake repair of irrigation infrastructures.
Shelter	Department of Revenue will provide and arrange for the physical needs of individuals, families and communities for safe. Secure and comfortable living space compatible with season.
Media	Department of public relations will provide and collect reliable information on the status of disaster and disaster victims for effective coordination of relief work at all levels.
Help Lines	All nodal departments will collect, process and disseminate information about the welfare of citizens of the affected area Assist in managing the flow of information maintaining accuracy as well as easy access. The help lines will be responsible for providing, directing, and coordinating, logistical resource operations.

List of Nodal Officers in Departments

Sr. No.	Name of Department	Name of Nodal Officer	Telephone No(s)
1.	Town & Country Planning	Town & Country Planner(HQ)/Assistant Town Planner-I (HQ)	-
2.	Ayurveda	Dr. Jagbir Sharma, Assistant Director	-
3.	Planning	Sh. Arjun Singh, Dy. Director	Tel.No. 2880561/ 2627834/ 94180-40213 E-mail ID hp-arjun@yahoo.co.in
4.	HP Vidhan Sabha	Sh. Des Raj Malhotra, Under Secretary (Estt)	Contact No. 2881105 (O) 2835475 (R) 94180-35474 (M)
5.	Directorate of Urban Development	Sh. Deva Singh Negi, Addl. Director (UD)	(O)0177-2626516 (M)94180 - 73998 Fax No. 0177-2626516 E-mail : udhp@nic.in

6.	Economics & Statistics Department	Sh. N.B. Sharma, Deputy Director	0177-2626205/ 2626206 E-mail: ud.hp@nic.in
7.	PWD	Sh. MK Manhas, SE (Works)	94180 10636
8.	Deputy Director, Horticulture (P&P)	-	EPBX-0177-2842354, 2842773, 2842147 Extension-401 Telefax-2841199
9.	Sainik Welfare Deptt.	Sh. Baldev Raj Verma, Sub Regional Employment Officer, Hamirpur	01972-222825
10.	Directorate of Prosecution	Sh. Jawahar Lal Sharma, Jt. Director (Prosecution) HQ	0177-2624590 E-mail: prosecution-hp@mail.nic.in
11.	Local Audit Department	Sh. Deena Lal Thakur, Deputy Director	Tel.No. 0177-2620881 Fax No. 0177-2626670
12.	Directorate of Agriculture	Joint Director (Agri)	Tel. No. 0177-2830644 Fax No. 0177-2830612 E-mail: krishinidesh @ yahoo.com.
13.	Additional Directorate of Police, HP Shimla	IGP/AP&T	Tel.No. 0177-2626948 Fax No. 0177-2626945-36 E-mail: igp-apt-hp@nic.in
14.	Directorate of Medical Education & Research, HP Shimla Dr. Rajendra Prasad, Govt. Medical College, Kangra at Tanda	Dr. Anil Malhotra Prof. Deptt. of Survery, IGMC, Shimla Dr. Bhanu Awasthi Prof. & Head (Ortho)	Tel. No. 2671744& 2883316/ 2883316 Tel. No. 01892-287187 (O) Mobile: 94181-01641
15.	Directorate of AH	Dr. R.P. Sharma, Deputy Director (Poultry Dev.)	
16.	Department of Panchayati Raj	Sh. Chaman Dilta, Joint Director (PR)	0177-2623814 Fax No. 2629106 E-mail ID: panchbo.hp@nic.in
17.	Directorate of Youth Services & Sports	Dy. Director, Indira Gandhi State Sports Complex, Shimla Virender Singh Negi Dy. Director District YSS Officer, Bilaspur District YSS Officer, Chamba Distt. YSS Officer, Hamirpur	0177-2806520 (M) 94181-16116 Fax No. 0177-2806520 0177-2620987 (M) 94184-339339 Fax No. 0177-2620987 01978-222611 (M) 94180-00466 01899-224403 (M) 94187-17827 01972-223851 (M) 94180-49911 Fax No. 01972-223851

		-do- Kangra at Dharmashala	01892-222317 (M) 94182-95480 Fax No. 01892-222317
		-do- Kinnaur at R.Peo	01786-222625 (M) 94184-88701
		-do- Kullu	01902-224702 (M) 94181-02743
		-do- Lahaul at Keylong	01900-222262 (M) 94186-25369
		-do- (Youth Organizer) Spiti at Kaza	01906-222258 (M) 94185-56189
		-do- Mandi	01905-235524 (M) 94181-32507 Fax No. 01905-235524
		-do- Solan	01792-223462 (M) 94180-024267
		-do- Shimla	0177-2803981 (M) 94180-09267 0177-2803981
		-do- Sirmaur at Nahan	01702-224176 (M) 98161-19119
		-do- Una	01975-223467 (M) 94183-01166
18.	IPH Deptt.	Er. KK Gupta SE (Works)	(O) 0177-2655262 (M) 98162-24816 Fax No. 0177-2812841 E-mail ID: hpirrg@rediffmail.com
19.	Finance Department – Treasuries, Accounts & Lotteries.	Sh. Deepak Bhardwaj Joint Director	(O) 0177-2621820 Fax No. 0177-2621820 E-mail: jdirtre-hp@nic.in
20.	HP Power Transmission Corporation Limited, Barowalia House, Khalini	Er. K K Kapil, Sr. Manager, HPPTCL, Kullu	
21.	Directorate of Transport, Shimla	Sh. KC Chaman Secretary STA Directorate of Transport, Shimla	transport-hp@nic.in 0177 2811335 0177 2803136 (Fam)
22.	Department of Tribal Development	Sh. Jai Pal Singh Negi, Deputy Director (TD)	

23.	Electrical Inspectorate	Er. D N Verma, Assistant Electrical Inspector, O/o Chief Electrical Inspector, SDA Complex Kasumpti	0177 2628090 9418001677
24.	GAD	Additional Secy GAD	0177 2622686
25.	Forest	Sh. Avtar Singh, Chief Conservator of Forest (FP & FC), Bilaspur – Forest Fire Sh. S Pande, CCF (FD & PAN) O/o PCCF (Wild life) – Human Animal Conflict	01978 221616 (o) 221717 (R) 0177 2623540
26.	SASE, Chandigarh	Mr. Naresh Kumar Thakur, Technical Officer (D) SASE, Him Parisar, Sector 37- A, Chandigarh	0172 2699804 - 806
27.	IIT Roorkee	Prof. HR Wason Head Deptt. Of Earthquake Engineering, IIT Roorkee	01332 285228 (O), 285556 (R) 09412071216 wasonfeg@iitr.ernet.in ; wason2009@gmail.com
28.	Fisheries	Dy. Director (HQ), Fisheries, Distt. Bilaspur	01978 – 223212 01978 224068 Fax 224068
29.	Higher Education	Prof. Amar Dev	0177-2658202 (207/307) Mobile: 9418270634
30.	HIPA	Dr. R. K. Sood	0177-2740225 9418464024
31.	Health and Family Welfare	Dr. Suman Shankar, Deputy Director, Health Services	
32.	Tanda Medical College	Dr. Bhanu Awasthi	9418101641 bhanu228465@yahoo.com
33.	Tourism and Civil Aviation	Sh. Surjeet Kumar Publicity Officer, Deptt. Of Tourism & Civil Aviation, Block No. 28, SDA Complex, Kasumpti – 9	0177 2625924 9418105752
34.	LAD	Sh. Padam Singh Kanwar, Deputy Director	9418482805
35.	HRTC	Mr. Pankaj Singhal, Divisional Manager, HRTC, Head Office Shimla	
36.	Civil Defence and Home Guards	Mr. Anuj Tomar Commandant (Training), CTI, Junga, Shimla.	0177- 2752428
37.	Backward Classes Commission	Sh. DR Sharma, Superintendent Gr. II Block No. 38, Kasumpti	0177- 2620302

Nodal Ministries at Union Level

Ministries Responsible for Various Categories of Disasters:

Disasters	Ministries / departments
Earthquakes and Tsunami	MHA/Ministry of Earth Sciences/IMD
Floods	MHA/Ministry of Water Resources/CWC
Cyclones	MHA/Ministry of Earth Sciences/IMD
Drought	Ministry of Agriculture
Biological Disasters	Ministry of Health and Family Welfare
Chemical Disasters	Ministry of Environment & Forests
Nuclear Disasters	Ministry of Atomic Energy
Air Accidents	Ministry of Civil Aviation
Railway Accidents	Ministry of Railways

Nodal Departments at State Level

Type of Hazard	Primary Agency/Department	Supporting Agencies / Departments
Water and Climate Related Disasters		
1. Floods	Department of I and PH	IMD, CWC, ES&T
2. Hailstorm	Department of Agriculture and Horticulture	IMD, Home, insurance and Revenue
3. Cloud Burst	Department of I and PH	IMD, CWC, ES&T, Revenue
4. Heat Wave and Cold Wave	Department of Revenue	IMD, ADMN, forest, Health
5. Snow Avalanches	Snow and Avalanche Study Establishment (SASE), Manali (DRDO)/Deptt. of Home/ ES&T	Tribal Admin, IMD, Health, Home and Revenue, Mountaineering Institute/S&T/GSI
6. Droughts	Department of Agriculture/IPH	IMD, Revenue, RD, Nauli and Palampur universities/ Department of Land records
7. Thunder and Lightning	Department of Revenue	IMD/ES&T
Geologically Related Disasters		
8. Landslides and Mudflows	Geological Wing of Department of Industries, PWD, BRO & UD	GSI,CRRI, Ministry of Earth Sciences, Wadia Institute of Geology, Wadia Institute of Himalayan Geology
9. Earthquakes	Department of Environment, Science and Technology	IMD, Ministry of Earth Sciences/GSI
10. Dam Failures/ Dam Bursts	Department of MPP and Power	IPH
Chemical, Industrial And Nuclear		
11. Chemical and Industrial Disasters	Department of industries/ Department of labour and employment	HPSEB, Department Of labour & employment, Home, Admn, DMI Bhopal, and NDRF

12. Nuclear Disasters	Department of Home	DEST, Admn, Central Ministry of Atomic Energy & Defence
Accident Related Disasters		
13. Forest Fires	Forest Department	Fire Department, ES&T, Home and Admn
14. Urban Fires	Department of Home(Fire)	IPH, Health,TCPI, Admn and Home
15. Major Building Collapse	Department of UD	PWD, Health, Home and Admn
16. Serial Bomb Blasts	Department of Home	Admn, Health and Family Welfare
17. Festival related disasters	Department of Home	Admn, Health and Family Welfare/Department of Art language and culture
18. Electrical Disasters and Fires	HPSEB/ MPP and Power	Home, Health and Revenue
19. Air, Road and Rail Accidents	Department of Transport, Indian Railway and Civil Aviation/GAD	Home, Health and Family welfare and Admn/Revenue
20. Boat Capsizing	MPP and Power/IPH	BBMB, Home, Health and Family Welfare and Admn.
21. Village Fire	Department of Home	Home, Revenue, Health and Family Welfare
Biologically Related Disasters		
22. Biological Disasters and Epidemics	Department of Health	Home, Revenue and NDRF
23. Pest Attacks	Department of Agriculture and Horticulture	Home, Revenue. and NDRF
24. Cattle Epidemics	Department of Animal Husbandry	Home, Revenue. and NDRF
25. Food Poisoning	Department of Health	Home, Revenue and NDRF

Nodal Agencies for Early Warning

Following are the Nodal agencies in the Government of India and in the state mandated for early warning of different natural hazards prevailing in the state of Himachal Pradesh:

Disasters	Agencies	Agencies at State level
Cyclone	Indian Meteorological Department	Agriculture Department
Tsunami	Indian National Centre for Oceanic Information services	N/A
Floods	Central Water Commission	IPH
Landslides	Geological Survey of India	Geology wing of industry department.
Avalanches	Snow and Avalanches Study Establishment SASE(DRDO)	Department of Environment Science & Technology
Heat & Cold Waves	Indian Meteorological Department	Department of Revenue

Locations of Helipads in Himachal Pradesh

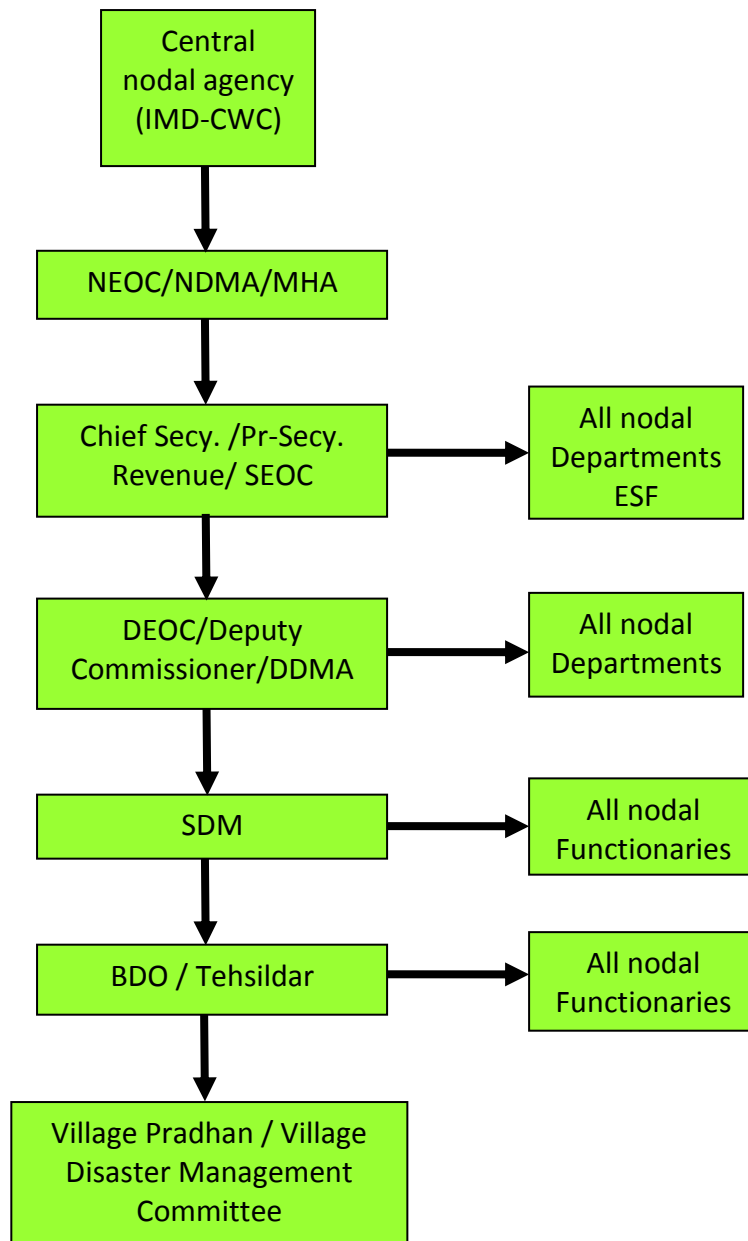
Sr. No.	Name	Latitude	Longitude
1.	BARMANA	31.424167	76.830833
2.	BILASPUR	31.333333	76.750000
3.	SHAH TALAI	31.450000	76.516667
4.	GHUMARWIN	31.450000	76.716667
5.	HATWAR	31.583333	76.700000
6.	GEHRWIN	31.366667	76.683333
7.	JHANDUTTA	31.366667	76.650000
8.	BUHAR (KOTIDHAR)	31.316667	76.633333
9.	SWARGHAT	31.225000	76.708333
10.	BBMB FOOTBALL GROUND NANGAL	31.383333	76.366667
11.	NFL GROUND NAYA NANGAL	31.383333	76.366667
12.	LUHNU	31.333333	76.750000
13.	GSSS JUKHALA	31.266667	76.850000
14.	NAMHOL	31.261111	76.865278
15.	BAKLOH	32.488889	75.922222
16.	BANIKHET	32.552778	75.958333
17.	BHARMOUR	32.447222	76.541667
18.	CHAMBA	32.572222	76.119444
19.	CHAURI	32.441667	76.008333
20.	CHHATRU	32.325000	77.383333
21.	KILLAR	33.086111	76.408333
22.	SAACH	33.033333	76.416667
23.	AJOG	32.925000	76.463889
24.	BARSAR	31.533333	76.463889
25.	HAMIRPUR	31.688889	76.541667
26.	NADAUN	31.783889	76.369444
27.	SUJANPURTIHRA	31.831944	76.500278
28.	BIAR	31.569444	76.479167
29.	BARU	31.680556	76.540278
30.	GOVT. COLLEGE GROUND HAMIRPUR	31.702778	76.521389
31.	KANJYAN	31.680556	76.637500
32.	SAMIRPUR	31.721667	76.651389
33.	JUNGALBARI	31.843333	76.531389
34.	NIT HAMIRPUR	31.705833	76.524722
35.	BAIJNATH	32.050000	76.633333
36.	DHARAMSALA	32.176389	76.307778

37.	GAGAL	32.175000	76.272222
38.	JAISINGPUR	31.908333	76.605556
39.	NURPUR	32.183333	75.900000
40.	PALAMPUR (AR)	32.116667	76.563889
41.	PALAMPUR (UN)	32.102778	76.558333
42.	PONG DAM	32.016667	75.902778
43.	REHAN	32.169444	75.913889
44.	SAPRI	31.897222	76.308333
45.	YEOL	32.163889	76.372222
46.	DHARAMSHALA ARY GROUND	32.250000	76.166667
47.	DHALIARA	31.856944	76.193611
48.	SHAHID BHUVNESH DOGRA GROUND DEHRA	31.866667	76.212778
49.	GIABUNG	31.775000	78.441667
50.	CHOLLING (NEAR KARCHHAM ARMY)	31.583333	78.083333
51.	KARCHAM	31.516667	78.172222
52.	POOH	31.758333	78.588889
53.	RAKCHHAM	31.383333	78.380556
54.	RECKONG PEO	31.891667	78.286111
55.	SANGLA (JP IND)	31.430556	78.241944
56.	SUMDO	32.058333	78.605556
57.	KUPPA	31.441944	78.245278
58.	ROPA	31.790278	78.449167
59.	JANGI	31.608333	78.433333
60.	LARJI	31.716667	77.216667
61.	MANALI	32.250000	77.183333
62.	NAGAR	32.119444	77.152778
63.	PALCHAN	32.310000	77.189444
64.	BARING	32.655556	76.850000
65.	CHHOTA DARA	32.266667	77.516667
66.	JISPA	32.642778	77.189444
67.	KAZA	32.216667	78.080556
68.	RUKLING	31.604167	78.438056
69.	SAGNAM	32.034722	78.058333
70.	SISSU	32.480556	77.118056
71.	STINGRI	32.569444	77.077778
72.	TABO	32.097222	78.383333
73.	TANDI	32.538889	76.980556
74.	TINDI	32.750000	76.466667
75.	TINGRIT	32.850000	76.786111

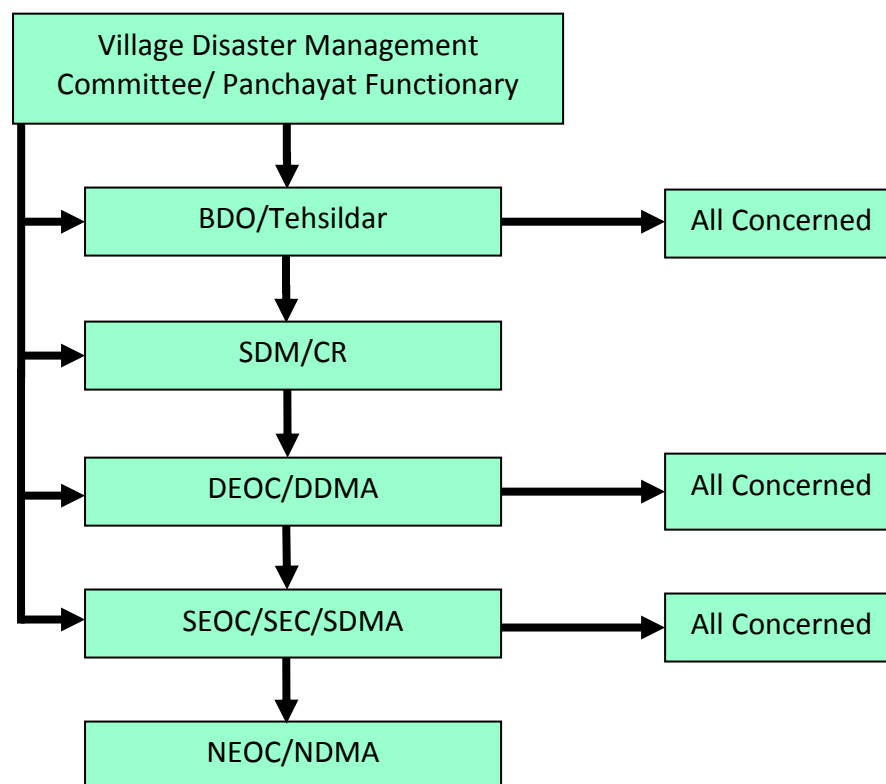
76.	UDAIPUR	32.711111	76.666667
77.	JUNJAIL	31.522222	77.222222
78.	KARSOG	31.391667	77.227778
79.	MANDI	31.711111	76.938889
80.	PANDOH	31.673056	77.055556
81.	PRASHAR LAKE	31.758333	78.000000
82.	SARKAGHAT	31.681667	76.729444
83.	SUDHAR	31.933333	76.983333
84.	SUNDERNAGAR	31.519444	76.888889
85.	KANGU	31.441667	76.858333
86.	THACHI	31.680556	77.211111
87.	BATAIL	31.584722	76.740556
88.	DHARAMPUR MANDI	31.805556	76.762500
89.	KAW KARSOG	31.356667	77.231111
90.	BASA	31.583333	77.333333
91.	SHIKARI DEVI	31.483333	77.166667
92.	JOGINDERNAGAR (DOHAG)	31.997222	76.762778
93.	GOVT. POLY. TECH. COLLEGE GROUND SUNDERNAGER	31.250000	76.897222
94.	GSSS KARSOG (MUMAIL)	31.383333	77.202778
95.	ANNADALE	31.119444	77.163889
96.	CHOPAL	30.958333	77.588889
97.	DODRAKAWAR	31.208333	78.088889
98.	DEHA (SHIMLA)	31.466667	77.450000
99.	JHAKHARI	31.505556	77.719722
100.	JUBBAL	31.116667	77.663889
101.	KALYANI (RETREAT)	31.138889	77.300000
102.	KANDA	31.566667	77.163889
103.	KUMARSAIN	31.325000	77.452778
104.	RAMPUR	31.466667	77.636111
105.	ROHRU	31.216667	77.752778
106.	SARAHAN	31.511111	77.797222
107.	THEOG	31.133333	77.041667
108.	THARU NANKHARI	31.333333	77.550000
109.	SEONI	31.255556	77.133333
110.	AMBOTA	30.777778	77.688889
111.	RAJGARH	30.833333	77.302778
112.	HARIPURDHAR	30.766667	77.533333
113.	KAFOTA	30.625000	77.700000
114.	KALA AMB	30.530556	77.202778

115.	NAHAN	30.569444	77.291667
116.	PAONTA SAHIB	30.438889	77.627778
117.	SANGRAH (AT JAUGADHDHAO)	30.697222	77.444444
118.	SARAHAN (SIRMOUR)	30.716667	77.200000
119.	SHILAI	30.683333	77.700000
120.	TRILOKPURI	30.594444	77.517778
121.	BARU SAHIB	30.758333	77.300000
122.	DNKNAR	30.716667	77.288889
123.	HALHAN	30.733333	77.638889
124.	SHALANA RAJGARH	30.841667	77.300000
125.	RENUKA	30.608611	77.449722
126.	BAROTIWALA (SCHOOL GROUND)	30.933333	76.816667
127.	DAGSHAI	30.866667	77.083333
128.	NALAGARH	31.041667	76.716667
129.	NAUNI	31.866667	77.172222
130.	SANAWR	30.908333	77.000000
131.	SOLAN(ARMY)	30.916667	77.100000
132.	BOHAR	31.319444	76.636111
133.	M/S JINDAL MECTECH PVT AS LANDING GROUND NALAGARH	31.500000	76.716667
134.	CHAIL	30.963056	77.211111
135.	BADIDHAR, 2KM AWAY FROM BATAL CHOWK	32.500000	76.950000
136.	SHALAGHAT (KOTLI)	31.211111	76.983333
137.	MARKET COMMITTEE DHALLI (PARWANOO)	30.838889	76.988889
138.	GSSS DHARAMPUR GROUND	30.966667	76.816667
139.	GOVT. COLLEGE GROUND NALAGARH	31.033333	76.750000
140.	GROUND OF UHF NAUNI	30.866667	77.166667
141.	SANGNAI(AMBOTA) UNA	31.705000	76.342222
142.	UNA	31.472222	76.266667
143.	DULEHAR	31.341944	76.212778
144.	KANGAR	31.443611	76.209444
145.	SNGNAI	31.702778	76.044444
146.	THANAKALAN	31.580556	76.347222
147.	KHAD PLAY GROUND	31.526667	77.502778
148.	POLICE LINES JHALEHRA	31.488333	76.244722
149.	GOVT. SS SCHOOL SALOH	31.477778	76.200000
150.	GOVT. ELEMENTARY SCHOOL GROUND CHURURU	31.606111	76.158611
151.	AMB GONDPUR BENERA	31.748333	76.033889
152.	MANDALI	31.526111	76.359444

The information flow when warning signals are available:



Information flow in situation when early warnings are not available:



IMPORTANT CONTACT DETAILS FOR DISASTER RESPONSE
DISASTER MANAGEMENT DIVISION, MINISTRY OF HOME AFFAIRS
 (for reporting of grave disaster and for requisitioning of Army, Air force and NDRF)

Name of Officer / Designation	Telephone (Office)	Telephone (Residence)	Mobile No.	Email id
R. K. Singh HOME SECRETARY	23092989 23093031 23093003 (Fax)	24103058		hshso@nic.in
A.E. Ahmad SECRETARY (Border Management)	23092440 23092717 (Fax)	24602518		secybm@nic.in
Ravindra Kumar Srivastava Joint Secretary (Disaster Management)	24638206 24610906 (Fax)	26874825		jsdm@nic.in
Dev Kumar Director (Disaster Management-I)	24642853	26266708	9871087616	
J P Mishra Director (NDM –II)	24642381			
Sanjay Aggarwal Director (NDM – III)	24642381			

Control Room (Disaster Management)	23093563 23093564 23093566	23093750 (Fax)		
Toll Free No. (MHA, C/R)	011-1070			

NATIONAL DISASTER MANAGEMENT AUTHORITY
(for reporting of grave emergencies and request for specialized response)

Name of Officer / Designation	Telephone (Office)	Telephone (Residence)	Mobile No.	Email id
M. Shashidhar Reddy , MLA, Vice Chairman	011-26701701 011-26701704 011-26701706 (Fax)			vc@ndma.gov.in
Dr. Sutanu Behuria Secretary	011-26701710			secretary@ndma.gov.in
Shri Amit Jha , JS (Admn)	011-26701718	011-26109395	09717873412	amitjha@ndma.gov.in
Shri P K Tripathi , Advisor & JS(Mitigation)	011-26701816		09868889697	pktripathi@ndma.gov.in
Sujata Saunik , JS (PP)	011-26701817			jsadm@ndma.gov.in
Control Room	011-26701723 to 728	011-26701729 - 30		

SNOW & AVALANCHE STUDY ESTABLISHMENT (CHANDIGARH) (DRDO) (0172)
(For snow avalanche early warning and related issues)

Name of Officer / Designation and Location of Deployment	Telephone (Office)	Telephone (Res.)	Mobile No.	Email id
A. Ganju Jt. Dir.	2699804-806	2705990	09872083177	2699802
Rajesh Chand Thakur , T.O.(B)			09417049754	

GEOLOGICAL SURVEY OF INDIA
(For landslide related issues)

Name of Officer / Designation and Location of Deployment	Telephone (Office)	Telephone (Residence)	Mobile No.	Email id
N.L. Sharma , Director Geological Survey of India Plot No 3 Dakshin Marg Sector 33B Chandigarh - 160020	0172- 2622529 0172- 2621945 (Fax)	0172-2661002		gsichd@sancharnet.in

INDIAN METEROLOGICAL DEPARTMENT (SHIMLA)
(for weather related early warning and data)

Name of Officer / Designation and Location of Deployment	Telephone (Office)	Telephone (Residence)	Mobile No.	Email id
Manmohan Singh, Director	0177-2626211	0177-2626490	9816127668	mm_sandhu@yahoo.co.in
R.K. Lakhanpal, Asstt Meteorologist	0177-2624976	0177-2652408	9418277093	
Ranvir Singh	0177-2624976		9418061077	ranvir_10@yahoo.com
Harminder Dutta, Caretaker (VOR)	0177-2624976		9418119123	harminder.dutta@imd.gov.in

CENTRAL WATER COMMISSION (SHIMLA)
(For floods/flash floods and early warning thereof)

Name of Officer / Designation and Location of Deployment	Telephone (Office)	Telephone (Residence)	Mobile No.	Email id
Director (M&A) CWC, Block 10, First Floor Commercial Complex, Kasumpti Shimla 171009	0177-2624036 0177-2624224 (Fax)	0177-2625307		
Ex, Engineer, Snow Hydrology Divn CWC, Block 9, First Floor Commercial Complex, Kasumpti Shimla 171009	0177-26230260 0177-2623026 (Fax)	0177-2628247		

AIR HQR (EXCHANGE NO-23010231)
(For requisition of Air force in disasters)

Name of Officer / Designation and Location of Deployment	Telephone (Office)	Telephone (Residence)	Mobile No.	Email id
ACAS (Ops)	23014424 23010231/7528 Fax 23017627	24672974	9871213393	
PD Ops (Off) (T&H)	23110231/7559 23016354 Fax 23016354	24642195	9871097909	
Dir Ops (T)	23010231/7545 2305857	23098030		

Dir Ops (H)	23010231/7551 Fax 23016354	25674906		
JD Ops (LS)	23010231/7546 Fax 23016354		9818220586	
JD Ops (H)	13010231/7552 Fax 23792973		9868468583	

ARMY HQR (EXCHANGE NOS-23010131/23018197)
(For requisition of army during disasters)

Name of Officer / Designation and Location of Deployment	Telephone (Office)	Telephone (Residence)	Mobile No.	Email id
DGMO	23011506 E-33170 Fax 23011506	23011506 E-33172		
ADGMO (A)	23011611 E-33174 Fax 23011617	24615208 E-35251		
ADGMO (B)	23014891 E-33176 Fax 23011617	26142269 E-39124		
Dir MO – 6	23018034 E-33220 Fax 23011617		9818106439	
GSO-I MO - 6	23019739 E-33221 Fax 23011617		E-39823 9810431696	
DirOL – 2	23335218 23018530 E-35221	23339055		

ARMY TRAINING COMMAND, SHIMLA
(For Army assistance)

Name	Designation	Contact No.	Address
Army Exchange		0177 2804590 - 92	Shimla - 3

CIVIL MILITARY LIASON FOR DISASTER RELIEF OPERATION (AIR)
CONTACT DETAILS OF AIR FORCE STATION SARSAWA, SAHARANPUR, UTTAR PRADESH
(For Requisition and Deployment of Helicopters in Disasters)

Name	Designation	Contact No.	Address
Mr. Bhanu Johri	Group Captain and Station Incharge	Tel No. 01331 244919-207 Fax No. 01331 - 244822	AF Stn, Sarsawa Saharanpur (UP), PIN – 247232
Mr. Vineet Sharma	Wing Commander, Chief Operations Officer	As Above Cell No. + 91 7599342240	As Above

CENTRAL CRISIS GROUP
(National Level)
(For industrial and chemical disasters)

Name of Officer / Designation and Location of Deployment	Telephone (Office)	Telephone (Residence)	Mobile No.	Email id
Sh. Vijai Sharma, Secretary, Ministry of Environment & Forests, Paryavaran Bhavan, CGO Complex, Lodi Road, New Delhi-110003.	011-24361896 011-24360721 011-24360721 (Fax)	011-26883988		Vijay.sharma@nic.in
Sh. Rajiv Gauba, Joint Secretary, Ministry of Environment & Forests, Paryavaran Bhavan, CGO Complex, Lodi Road, New Delhi-110003.	011-24360634 011-24363577 (Fax)	0177-26192110	09871374660	

ALL INDIA RADIO
(For broadcasting services)

Name	Designation	Contact No.	Address
Mr. T K Tawal	Station Director	0177 2801899 (Office); Residence - 2831281 Fax 0177 2801899; email – airshimla@yahoo.com	Ambedkar Chowk, Shimla – 4
Mr. Devinder Mahindru	Programme Executive	0177 2563038 – O; 0177 2831748	As Above

Headquarter, CE DEEPAK PROJECT
(For Maintenance of Border Roads)

Name	Designation	Contact No.	Address
Mr. IR Mathur	Chief Engineer	0177 2830986 (Office); Residence – 2831850	Minto Court, Shimla – 4
Col. SS Pathania	-	0177 2633602 – (O) 0177 2831748	As Above

INDO-TIBETAN BORDER POLICE, TARADEVI, SHIMLA - 10
(For Requisition and Deployment in Disasters)

Name	Designation	Contact No.	Address
Sh. A S Chawla	DIG	0177 2830601 (O); 2830602 (R) Email - dighpitbp@sancharnet.in	Taradevi, Shimla – 10
	Staff Officer ADM to DIG	0177 2831010 (O), 2830604	As Above

BHARAT SANCHAR NIGAM LIMITED, HP CIRCLE SHIMLA - 10
(For communication related issues)

Name	Designation	Contact No.	Address
Mr. Rakesh Kapoor	Chief General Manager	0177 2620220 (O); 2625325 (Fax)	SDA Complex, Kasumpti
Mr. A V Chaturvedi	General Manager, Mobiles	0177 2673999 (O), 2673923 (Fax)	As Above
Mr. Prem Singh	General Manager, Telecom	0177 2800666 (O); 2800777 (Fax)	

INDIAN OIL CORPORATION
(For POL and LPG)

Name	Designation	Contact No.	Address
Mr. Piyush Mittal	Divisional Manager Sales	0177 2625768 (O); 2621706 2623158 (Fax)	Block No. 21, SDA Complex, Shimla
Mr. Mukesh Kumar	Manager, LPG	0177 2623133 (O), 2671350 (R)	As Above
Mr. Rajan Berry	Deputy Manager Sales	0177 2625363 (O)	As Above

CENTRAL PUBLIC WORKS DEPARTMENT
(For road clearance, machinery and manpower)

Name	Designation	Contact No.	Address
Mr. Gurbax Singh	SE	0177 2657531 (O); 2804696 (R), Cell - 9418004466 2652476 (Fax); email – sescshimla@yaoo.com	CPWD, Kennedy Cottage, Shimla - 4
Mr. J K Goel	XEN Planning	0177 2658131 (O), Cell – 09318050506	As Above
Mr. M P Singh	XEN	0177 2652830 (O), 2652412 (R)	As Above

CONTACT DETAILS OF NDRF OFFICERS
(For Specialized response during disasters)

NDRF Head Quarter

NDRF BATALLIONS

Name	Designation	Address	Contact No.	Email Id
Shri PM Nair, IPS	DG	Directorate General, National Disaster Response Force (NDRF) Sector-1 R K Puram, New Delhi -66	011-26712851 011-26161442, Mob: 09818916161 Fax: 011-26105912	dg-ndrf@nic.in
Shri Mukul Goel	IG	Directorate General , National Disaster	011-26160252 011-26113014,	-

		Response Force (NDRF) Sector-1 R K Puram, New Delhi -66	Mob: 09871115726 Fax: 011- 26105912	
Shri Rakesh Ranjan	Dy Commandant (Proc)	Directorate General , National Disaster Response Force (NDRF) Sector-1 R K Puram, New Delhi -66	011-26107921, Mob: 08860136649 Fax: 011- 26105912	rakeshbsf@gmail.c om
Shri Om Parkash	Inspector Control Room	Directorate General , National Disaster Response Force (NDRF) Sector-1 R K Puram, New Delhi -66	011-26107953, Mob: 08010072169 Fax: 011- 26105912	

Name	Designation	Address	Contact No.	Email Id
Sh.R.K.Verma	Commandant	7th Bn NDRF, Bibiwala Road, Bhatinda(Punjab)	0164-2246030, Fax: 0164- 2246570 Mob: 09417802032	comdt.27thbn@ itbp.gov.in, 7thbnndrfbathinda @ gmail.com
Sh. Jaipal Yadav	Commandant	8th Bn NDRF, Greater Noida, Distt.G.B.Nagar, UP	0120-2351101, 0120-2351087, Fax: 0120- 2351105, Mob: 09968610011	eighthndrf@ yahoo.com, jpyadav1960@ yahoo.com

**PART I:
GENERAL**

Chapter I - Introduction

1.1 State Profile

1.1.1 Physical Location:

Himachal Pradesh is predominantly a mountainous State located in North – West India. It shares an international border with China. The State has highly dissected mountain ranges interspersed with deep gorges and valleys. It is also characterized with diverse climate that varies from semi tropical in lower hills, to semi arctic in the cold deserts areas of Spiti and Kinnaur. Altitude ranges from 350 meters to 6975 meters above mean sea level. It is located **between Latitude 30° 22.40 N to 33° 12.20 N and Longitude 75° 45.55 E to 79° 04.20 E.**

1.1.2 Demography:

Population of Himachal Pradesh is 68.56 lakh persons as per the Census report for the year 2011. 89.01% of the total population inhabits 20,604 villages in the rural areas of the State. These villages are sparsely distributed across the State having population density as low as 1 person per square kilometer in the remote and tribal area of Lahaul & Spiti, Hamirpur district has largest population density of 369 persons per square kilometer as against 123 persons per square kilometer for the whole State. Himachal Pradesh is one of the few states of the country where gender equality is an integral part of the social ethos as well as the overall development strategy. Female literacy is well above the national level and women employment is much higher than in most states of the country.

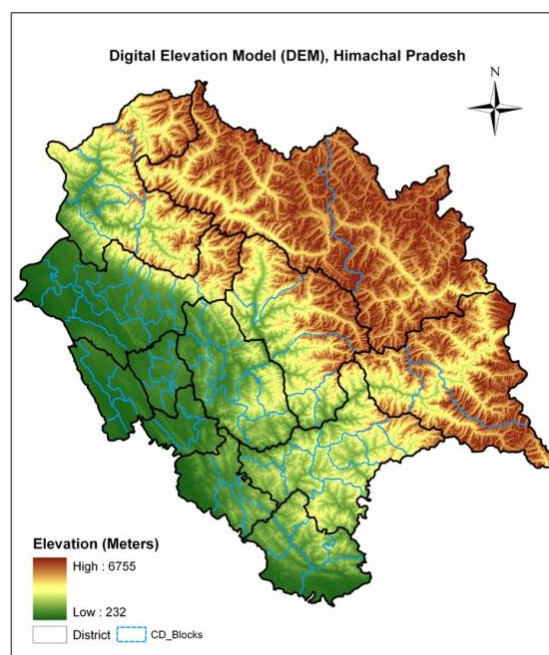


Figure 1.1 Digital Elevation Model, H.P.

Table 1.1 Demographic Features Since 1901

Year	Population	Decennial growth rate	Female per '000 males	Density per Sq. Km. (Persons)	Scheduled Castes (Percentage)	Scheduled Tribes (Percentage)
1901	1920294	-	884	34	-	-
1911	1896944	-1.22	889	34	-	-
1921	1928206	1.65	890	35	-	-
1931	2029113	5.23	897	36	-	-
1941	2263245	11.54	890	41	-	-
1951	2385981	5.42	912	43	22.69	0.26
1961	2812463	17.87	938	51	22.88	4.35
1971	2460434	23.04	958	61	22.24	4.09
1981	4280818	23.71	973	77	24.62	4.61
1991	5170877	20.79	976	93	25.34	4.22
2001	6077900	27.54	968	109	24.72	4.02
2011(P)	6856509	12.81	974	123	-	-

Source: Census of India.

Table 1.2 Areas, Density and Decennial Growth Population in Different Districts

District	Area in Sq. Kms.	Total Population		Decennial growth (2001-2011) (P)	Density per Sq. Km. (2011(P) Census)
		2011 Census	2011 (P) Census		
1. Bilaspur	1167	340885	382056	12.08	327
2. Chamba	6528	460887	518844	12.58	80
3. Hamirpur	1118	412700	454293	10.08	406
4. Kangra	5739	1339030	1507223	12.56	263
5. Kinnaur	6401	78334	84298	7.61	13
6. Kullu	5503	381571	437474	14.65	79
7. L&S	13835	33224	31528	-5.10	2
8. Mandi	3950	901344	999518	10.89	253
9. Shimla	5131	722502	813384	12.58	159
10. Sirmour	2825	45893	530164	15.61	188
11. Solan	1936	500557	576670	15.21	298
12. Una	1540	448273	521057	16.24	338
Himachal Pradesh	55673	6077900	6856509	12.81	123

Source: Census of India.

1.1.3 Administrative Units:

Twelve districts of the State have been divided into 3 Divisions, 52 Subdivisions, 77 Development Blocks and 3243 Panchayats. The PRI's are in place in all the 12 districts comprising 12 Zila Parishads, Panchayat Samitis in 77 Development Blocks, and Gram Panchayats in 3243 Panchayats. One Municipal Corporation in Shimla, 20 Municipal Councils and 28 Nagar Panchayats, besides 7 Cantonment Boards, represent the Urban Local Bodies infrastructure in the State.

1.1.4 Topography:

Topographically, the state can be divided into three zones:

- 1. The Shiwaliks or Outer Himalayas:** It covers the lower hills of Kangra, Hamirpur, Una, Bilaspur, lower parts of Mandi, Solan and Sirmour districts. Within this zone, altitude varies from 350 m to 1500 m.
- 2. Inner Himalayas or mid-mountains:** Altitude varies from 1500 m to 4500 m above mean sea level and includes areas such as the upper parts of Pachhad and Renuka in Sirmour district, Chachiot and Karsog tehsils of Mandi district and upper parts of Churah tehsil of Chamba district.
- 3. Alpine zone or the greater Himalayas:** Has altitude above 4500 m above mean sea level and comprises areas of Kinnaur district, Pangti tehsil of Chamba district and area of Lahaul & Spiti district.

1.1.5 Geology & Geomorphology:

Himachal Pradesh with its complex geological structures presents a complicated topography with intricate mosaic of mountains ranges, hills and valleys. Composed of recent Alluvium, Shiwalik hills are made up of rocks such as sandstone, shale and clay that came into existence during the Eocene, Miocene and Pliocene period.

The central part that extends from Chamba district in the north to Shimla district in the south is mainly represented by Jatog group of rocks which originated in middle Proterozoic period. In the north eastern portion unclassified Granites borders the central part in between Kullu, eastern Shimla, Lahaul Spiti and parts of Kinnaur district. The eastern greater Himalaya presents the Triassic formation which is found in Kaza tehsil of Lahaul Spiti district. The oldest rocks are Granites found at Jeori-Wangtu and Bandel near Largi in Kullu district. These granites date back to a stage of the crust at a time when India was located 8000 Km southwest of its present position.

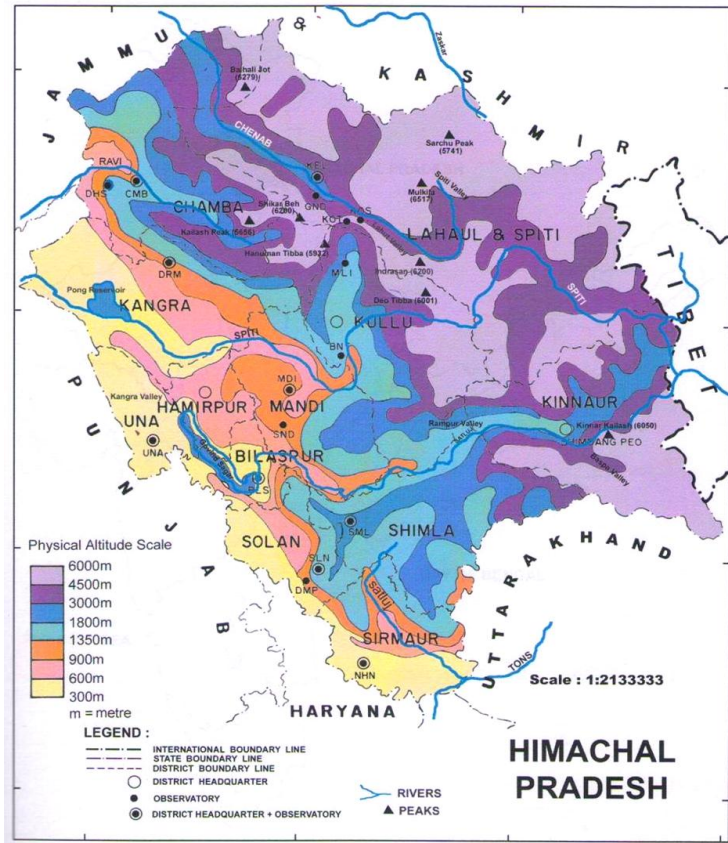


Figure 1.2 Geography of Himachal Pradesh

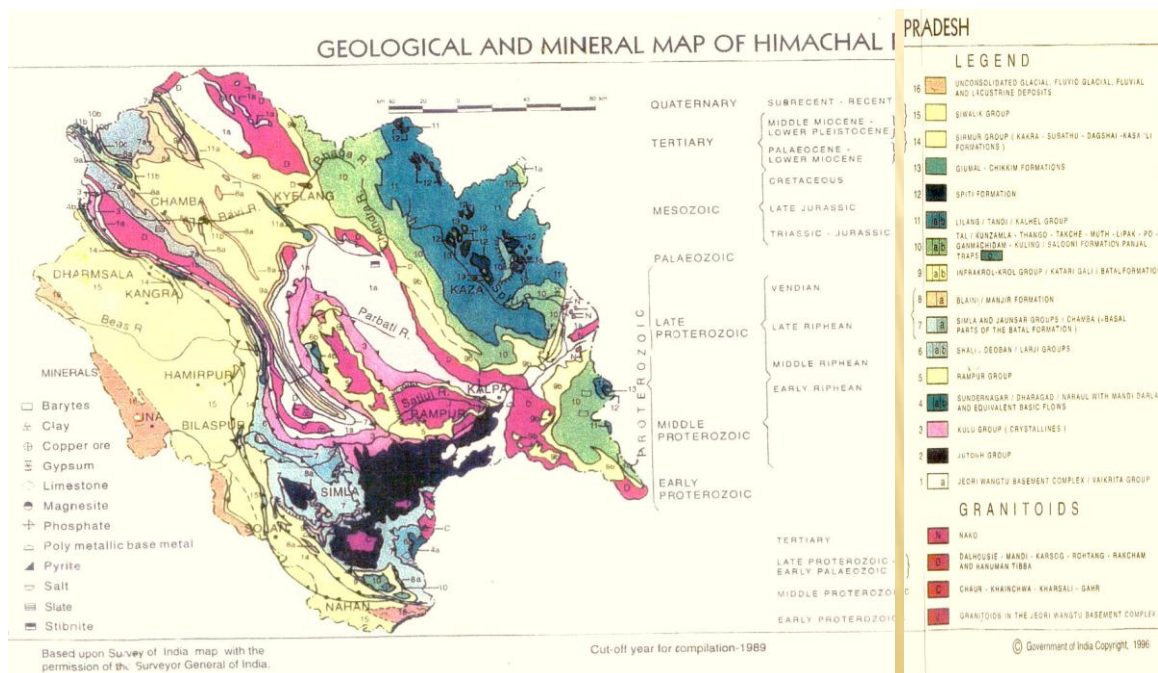


Figure 1.3 Geological and Mineral Map of Himachal Pradesh

Source: Survey of India.

1.1.6 Climate:

The climate varies across the state with the altitude. In the southern low tracks between an altitude of 400-900 it is hot sub humid type, between 900-1800m altitude warm & temperate, between 900-2400m cool & temperate, cold alpine & glacial above 2400-4800m altitude. Bilaspur, Kangra, Mandi, Sirmour, and Una districts experience sub tropical monsoon, mild and dry winter and hot summer. Shimla district has tropical upland type climate with mild and dry winter and short warm summer. Chamba district experiences, humid subtropical type climate having mild winter, long hot summer and moist all season. Kullu district experience mainly humid subtropical type of climate with mild winter moist all season, long hot summer and marine. During the period from January to February heavy snowfall in higher reaches create conditions for low temperature throughout the state making it unpleasant and series of western disturbances also affect the state.

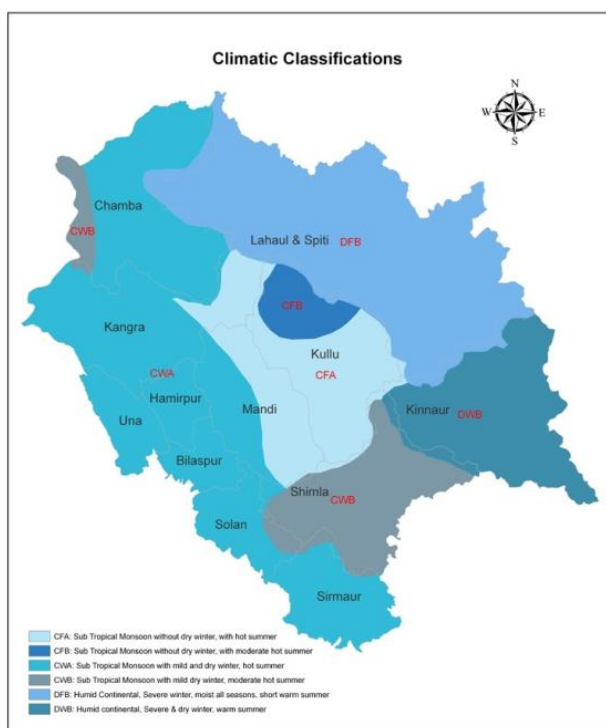


Figure 1.4 Climatic Classifications of Himachal Pradesh

Table 1.3 Climate Pattern of Himachal Pradesh

Climate Pattern	Districts
Sub-tropical Monsoon (Cwa type) Mild and dry winter, hot summer	Bilaspur, Kangra, Mandi, Sirmour, Una, Hamirpur, Solan, Chamba
Sub-tropical Monsoon (Cwb type) Mild and dry winter, moderate hot summer	Shimla, Parts of Chamba
Sub-tropical monsoon (Cfa type) Without dry winter with hot summer	Chamba, Major parts of Kullu, Mandi
Sub-tropical monsoon (Cfb type) Without dry winter with moderate hot summer	Minor parts of Kullu
Humid continental (Dwb type) Severe and dry winter, warm summer	Kinnaur
Humid continental (Dfb type) Severe winter moist all seasons, short warm summer	Lahaul & Spiti

Table 1.4 Average Annual Rainfall

Districts	Year		
	2008	2009	2010
1. Bilaspur	867.9	811.1	1079.7
2. Chamba	857.2	1019.0	1117.5
3. Hamirpur	1414.6	1179.2	1247.1
4. Kangra	1947.9	1386.0	1619.6
5. Kinnaur	354.1	269.4	1107.8
6. Kullu	1215.3	825.1	1732.5
7. Lahaul & Spiti	411.6	706.3	847.1

8. Mandi	1173.8	775.0	1495.4
9. Shimla	1211.4	825.6	1272.3
10. Sirmour	1432.6	905.9	1896.9
11. Solan	1368.2	862.8	1377.1
12. Una	1437.4	1329.8	1182.3
Himachal Pradesh (Average)	1141.0	907.9	1242.8

Source: Meteorological Department, Govt. of India.

Table 1.5 Maximum Temperatures at selected Centers- 2010

(in Celsius)

Center	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1. Saloni	10.8	8.0	13.0	16.7	19.7	22.4	23.5	23.5	22.6	26.6	23.9	20.1
2. Dharamshala	19.5	18.8	26.8	32.3	34.0	33.1	27.6	25.4	26.3	25.8	24.6	19.1
3. Kalpa	7.2	8.4	16.1	18.8	20.4	21.1	21.0	21.3	19.4	18.5	16.0	10.7
4. Bhuntar	19.0	18.9	26.8	30.9	32.0	31.3	29.9	30.6	29.4	28.3	24.3	18.5
5. Kelong	0.8	2.0	8.1	14.8	18.4	20.5	23.8	23.9	17.6	14.8	9.4	5.9
6. Sundernagar	21.2	22.0	31.3	34.9	36.0	33.7	30.3	30.5	29.8	29.4	25.6	20.1
7. Shimla	15.4	14.3	21.5	25.9	27.2	25.6	23.4	22.6	21.9	22.4	19.1	15.0
8. Nahan	18.4	21.3	28.7	34.5	35.0	33.7	28.4	27.3	26.6	27.4	23.7	18.6
9. Nauni	19.8	19.9	26.8	31.9	32.5	30.7	27.7	27.6	26.8	27.4	24.4	20.2
10. Una	18.7	25.1	33.0	38.7	39.5	38.6	33.5	33.0	32.9	31.9	28.6	21.9

Source- Meteorological Department Govt. of India

Table 1.6 Minimum Temperature at selected Centers- 2010

(in Celsius)

Center	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1. Saloni	6.8	5.0	8.9	13.2	16.4	17.5	19.4	20.5	18.0	9.8	6.9	2.4
2. Dharamshala	7.0	5.3	11.1	16.1	17.8	17.5	16.9	17.4	16.2	13.0	9.4	4.9
3. Kalpa	-4.4	-4.2	3.4	5.4	7.3	8.9	13.1	13.9	10.1	4.6	2.1	-1.4
4. Bhuntar	1.5	4.4	8.5	11.0	14.8	15.5	19.4	20.2	17.3	10.5	5.7	0.5
5. Kelong	-10.3	-9.0	-3.6	3.4	6.2	8.1	12.9	14.9	10.6	3.7	-0.6	-4.9
6. Sundernagar	2.2	5.5	11.0	14.6	17.9	18.4	21.5	22.2	19.1	12.6	6.9	1.2
7. Shimla	5.2	5.1	11.3	15.6	16.6	16.4	16.8	16.6	14.8	11.9	8.6	4.6
8. Nahan	7.6	10.6	18.3	24.6	25.1	24.2	19.7	19.7	17.9	17.2	12.5	7.4
9. Nauni	1.6	3.9	9.3	13.8	16.3	18.3	20.4	20.2	17.3	10.6	6.2	1.3
10. Una	2.3	5.4	11.3	15.7	18.6	20.8	22.5	22.5	20.3	15.2	10.0	4.0

Source- Meteorological Department, Govt. of India

1.1.7 Land use:

As per Land use statistics, Ministry of Agriculture (GoI), 2005, about 12.21 percent of the total reporting area of 4547000 ha of the state (out of 5567000 ha. of geographical area) is under cultivation. 24.06 percent under forest. Permanent pastures and other grasslands account for about 33.63 percent, 1.25 percent land under miscellaneous tree crops and groves, 2.73 percent is under the cultivable wasteland, fallow land other than current fallow 0.29 percent, current fallow 1.19 percent and net sown area is 12.21 percent.

1.1.8 Forests:

As per state of forests report, the recorded forest area in the state is 37,033 sq. km., which is 66.52 percent of the total geographical area of the state. Very dense forest is 1097 sq. km; moderately dense forest area is 7831 sq. km and 5441 sq. kms. of open forest area. Forest cover is 25.81 percent i.e. 14,369 sq. kms. There are six major forest types in the state i.e. Tropical dry, deciduous, subtropical pine, sub tropical dry evergreen, Himalayan dry temperate and Sub-Alpine/ Alpine forest.

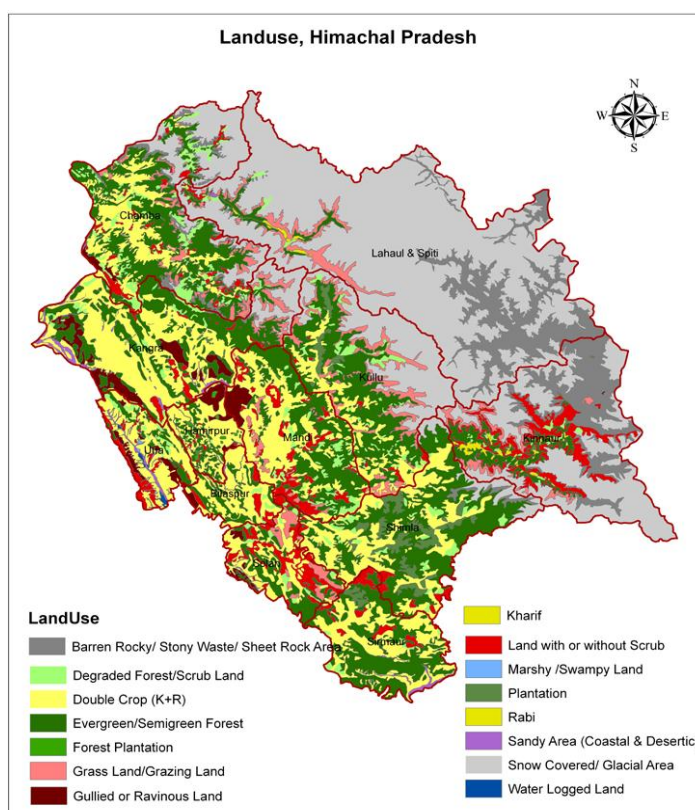


Figure 1.5 Land Use in Himachal Pradesh

Source: H.P. State Council for Science, Technology & Environment

Table 1.7 District wise Forest in Himachal Pradesh (Area in Sq. Kms.)

District	Geo. Area	Forest Area	Tree covered area				% of Geo. Area
			Very Dense Forest	Moderate Dense Forest	Open Forest	Total Forest Cover	
Bilaspur	1,167	428	24	171	167	362	31.02
Chamba	6,522	5,030	853	773	810	2,436	37.35
Hamirpur	1,118	219	39	92	114	245	21.91
Kangra	5,739	2,842	310	1,221	531	2,062	35.93
Kinnaur	6,401	5,093	82	263	257	602	9.40
Kullu	5,503	4,952	586	789	583	1,958	35.58
Lahaul & Spiti	13,841	10,133	15	32	146	193	1.39
Mandi	3,950	1,860	373	735	565	1,673	42.35
Shimla	5,131	3,418	739	1,037	608	2,384	46.46
Sirmaur	2,825	1,843	130	568	685	1,383	48.96
Solan	1,936	728	55	404	390	849	43.85
Una	1,540	487	18	298	205	521	33.83
Total	55,673	37,033	3,224	6,383	5,061	14,668	26.35

Source: Forest Survey of India Report 2009

1.1.9 Agriculture:

As per the state department of Agriculture, Himachal Pradesh is predominately an agricultural state and provides direct employment to about 71 percent of the total population. The Agriculture sector contributes nearly 30 percent of the total state domestic product. About 18-20 percent area is irrigated and rest is rain fed. Food grains production was 1440.66 thousand tonnes in the Year 2007-2008. The production of major crops of the state i.e. maize, rice and wheat for 2007-2008 was 682.61 thousand tonnes, 121.45 thousand ton and 61.2 thousand tonnes respectively. The vegetable production for 2007-2008 was 1060.00 thousand tonnes.

1.1.10 Rivers and Catchments:

Five perennial rivers Satluj, Beas, Ravi, Chenab and Yamuna flow through the state. The utility of these rivers though restricted considerably by the rugged and undulating terrain of the State, nevertheless, these rivers possess immense potential for the generation of hydro-electricity. The following river catchment areas fall in the State.

Table 1.8 River Catchment Areas in Himachal Pradesh

Name of River System	Area of Catchment	Area in percentage
Sutlej	20,398	30.69%
Beas	13,663	24.50%
Chenab	7,850	14.20%
Yamuna	5,872	10.60%
Ravi	5,528	09.90%
Indus	1,450	02.60%
Markanda	360	00.60%
Ganga	290	00.50%
Ghaggar	262	00.50%
TOTAL	55,673	100.00

1.1.11 Lakes/Reservoirs:

The state has both manmade and natural water bodies located in different parts of the state for specific purposes viz. irrigation, hydro-electricity, and flood control. Some of the important reservoirs of the state are Gobind Sagar, which spreads into the Bilaspur and Una districts, Pong Dam in Kangra, and Pandoh in Mandi District. Chandertal, Renuka and Manimahesh are some the important natural lakes of the state.

1.1.12 Health:

The State has an extensive network of health care institutions. There are 52 hospitals, 23 dispensaries, 77 CHC's / RH, 463 PHC's, with available bed capacity of 9173. Similarly there are 28 Ayurvedic hospitals, 1105 health centers with a bed capacity of 786 available in the state. Birth and death rate in the state is 22.1 per 1000 and 7.2 per 1000 respectively as per 2010-11 censuses.

1.1.13 Education:

The literacy percentage in the state is 83.78 percent as per 2011 census which is higher than the national average. The state has an elaborate network of educational institutions. As per 2011 census data, the number of primary schools in the state were 10767, 2303 middle schools, 2094 high and senior secondary schools and 88 colleges.

In the field of technical education, the state has 1 National Institute of Technology, 7 poly-techniques, 50 ITIs and 1 Motor driving and heavy earth moving operator training institute.

1.1.14 Roads and Bridges:

As per 2011 data, the state has total road length of 33722 Km in which motor able single lane is 29464 Km and motor able double lane is 2403 Km, Jeep able 290 Km and less than Jeep able 1565 Km and there are 1365 Km bridges. About 8156 villages are connected with roads.

1.2 State Disaster Management Plan

1.2.1 Paradigm Shift in Disaster Management

There has been a paradigm shift from a response and relief-centric approach to a proactive and comprehensive mindset towards DM covering all aspects from prevention, mitigation, preparedness, rehabilitation, reconstruction and recovery. It also provides:

- The creation of a policy, legal and institutional framework, backed by effective statutory and financial support
- Mainstreaming of multi-sector DM concerns into the developmental process.
- Putting in place a continuous and integrated process of planning, coordinating, *implementing* policies and plans in a holistic, participatory, Inclusive and sustainable manner.

1.2.2 National Vision

The national vision is to build a safer and disaster resilient India by developing a holistic, proactive, multi-disaster and technology driven strategy for DM. This will be achieved through a culture of prevention, mitigation and preparedness to reduce the impact of disasters on people. The entire process will centre stage the community and will be provided momentum and sustenance through the collective efforts of all government agencies supported by Non-Governmental Organisations (NGOs).

1.2.3 The role of state Disaster Management Authority (SDMA) / State Executive Committee (SEC) and the State Departments

According to Section 23 of the DM Act 2005, there shall be a DM plan for every state. It outlines the broad coverage of the plan as well as the requirements of consultation in the preparation of the state plans. It also provides for annual review and updating of the state plan, and enjoins upon the state governments to make provisions for financing the activities to be carried out under the state plans. It provides for the departments of the state governments to draw up their own plans in accordance with the state plan.

1.2.4 Purpose of Plan

To respond promptly and in a coordinated manner in any disaster like situation, it is mandatory to mitigate the potential impact of disasters to save lives of people and property in Himachal Pradesh.

1.2.5 Key Objectives

The aim of the state plan is to:

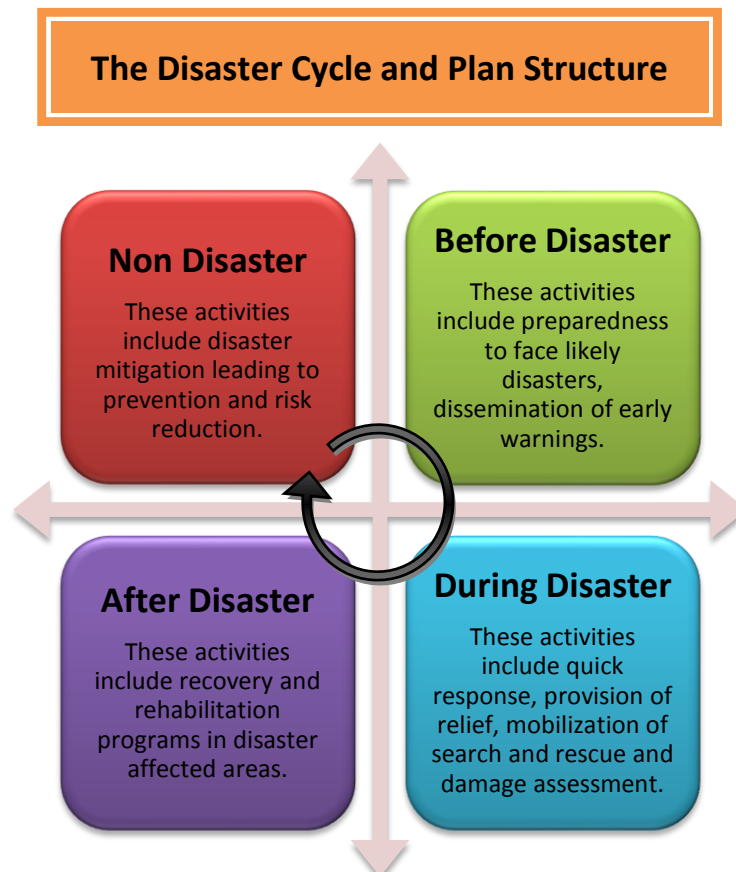
- Promote a culture of prevention and preparedness by ensuring that DM receives the highest priority at all levels.
- Ensure that community is the most important stakeholder in the DM process.

- Encourage and promote mitigation measures based on state-of-the-art technology and environmental sustainability.
- Mainstreaming DM concerns into the developmental planning process.
- Develop and establish contemporary forecasting and early warning systems backed by responsive and fail-safe communications and Information Technology (IT) support.
- Promote a productive partnership with the media for creating awareness and capacity development.
- Ensure efficient response and relief with a caring approach towards the needs of the vulnerable sections of the society.
- Undertaking reconstruction as an opportunity to build disaster resilient structures and habitat.
- Undertaking recovery to bring back the community to a better and safer level than the pre-disaster stage.

1.2.6 State Disaster Management Plan: An Approach

The DM Act promulgated by Parliament in 2005 ushered in a strategic shift in both the content and process of Disaster Management by mandating a holistic, integrated approach to the Disaster Management function of the state and creating a distinct structure for delivering it. It is in this context of changed structural and functional arrangements the roles, tasks and activities of different functionaries involved in DM has changed significantly. A paradigm shift has now taken place from the relief centric syndrome to holistic and integrated approach with emphasis on prevention, mitigation and preparedness. These efforts are aimed to conserve developmental gains as also minimize losses to lives, livelihood and property. A typical Disaster Management continuum comprising six elements i.e., Prevention, Mitigation, Preparedness in pre-disaster phase, and Response, Rehabilitation and Reconstruction in post-disaster phase, defines the complete approach to Disaster Management.

For efficient execution of the State Disaster Management Plan, the Plan has been organized as per these four stages of the Disaster Cycle.



1.2.7 Multi-Hazard Approach:

Himachal Pradesh is vulnerable to 25 out of 33 types of hazards identified by the High Powered Committee (HPC) of Government of India and categorised into 5 sub-groups. Apart from identified hazards by HPC, the state is also confronting the emerging threats of climate change and man and animal conflict.

Water and Climate Related Disasters:

1. Floods
2. Hailstorm
3. Cloud Burst
4. Heat Wave and Cold Wave
5. Snow Avalanches
6. Droughts
7. Thunder and Lightning

Geologically Related Disasters:

1. Landslides and Mudflows
2. Earthquakes
3. Dam Failures/ Dam Bursts

Chemical, Industrial and Nuclear:

1. Chemical and Industrial Disasters
2. Nuclear Disasters

Accident Related Disasters:

1. Forest Fires
2. Urban Fires
3. Major Building Collapse
4. Serial Bomb Blasts
5. Festival related disasters
6. Electrical Disasters and Fires
7. Air, Road and Rail Accidents
8. Boat Capsizing
9. Village Fire

Biologically Related Disasters:

1. Biological Disasters and Epidemics
2. Pest Attacks
3. Cattle Epidemics
4. Food Poisoning

Chapter II - Vulnerability Assessment and Risk Analysis

2.1 Hazards & Vulnerability

2.1.1 State Profile

Situated in the lap of Himalayas the State of H.P lies between latitude 30°22 to 33°12' N and 75°45'E to 79°4'E. It is surrounded on the south-east by the states of Uttarakhand, China on the east, Haryana on the south-west and J&K on the north. It is the geophysical setting of the state of Himachal Pradesh that controls and defines the meteorological characteristics and also has bearing on the occurrence and intensity of natural and manmade disasters. On account of the damage caused and widespread nature of disasters in the past this state can be called as one of the most unstable and disaster prone states of the country.

From south to north topographically and climatologically the setup of the State that define the type and intensity of multiple hazards can be visualized as follows:

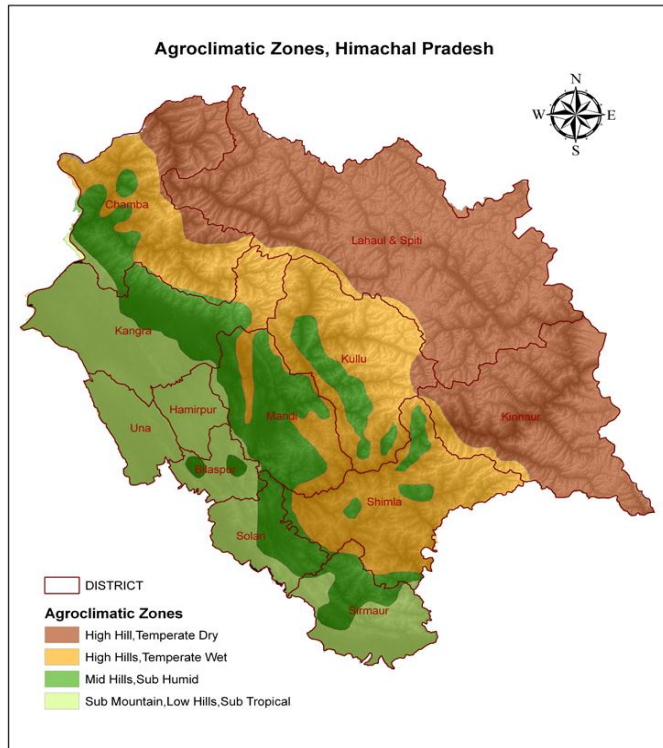


Figure 2.1 Agro-climatic Zones in Himachal Pradesh

Zone-I: Subtropical low-hill Shiwalik zone

This terrain is rugged with low mountains. Rainfall is between 800 to 1800 mm. The areas suffer from perpetual summer shortage due to high runoff. Valleys are generally narrow with few small flat areas where good agriculture is possible. Most of the streams are situated within narrow gorges and the terrain shows signs of rapid uplift in the recent past. The altitude ranges between 500 m and 1200 m above mean sea level.

Zone-II: Mid hill zone

The lesser Himalayas south west of the Dhauladhar range and valley areas of the Ravi and the Chenab rivers forms this zone. It occupies 32 percent of the geographical area and 53 percent of the cultivated area of the state. Altitude ranges between 800 and 1600 m above mean sea level. The average annual rainfall is about 1800 mm.

Zone-III: Dry hill zone

The upper parts of the catchment of the Zone II constitute Zone III. This zone occupies 25 percent of the geographical area and 11 percent of the cultivated area of the state. Altitude ranges between 1600 and 2700 m above mean sea level. The annual rainfall ranges between 1000 and 1500 mm.

Zone- IV: Cold hill zone

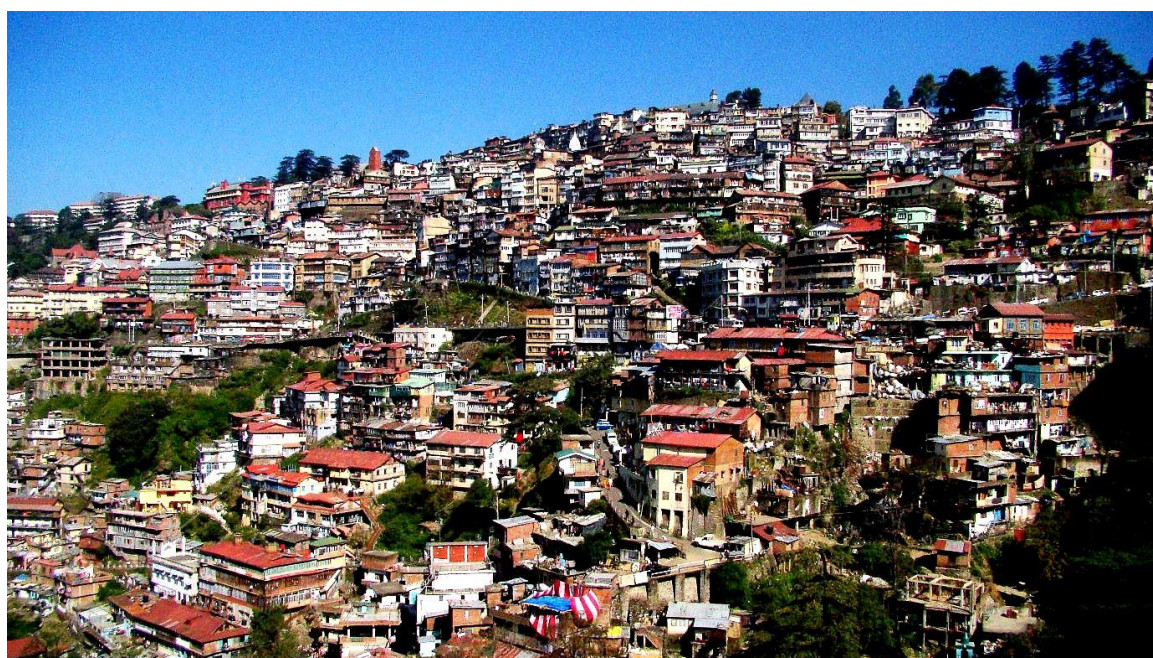
The trans-Himalaya zone lying between Great Himalayas and Zaskar Ranges is a cold desert. Altitude is generally above 2700 m. Due to rain shadow of great Himalayas, the annual rainfall is less than 200 mm. This zone occupies 8 percent of the geographical area and 3 percent of the cultivated area of the state.

2.1.2 Potential Hazard Threat to the State

Hazards both natural and manmade are of immediate concern to the State of Himachal Pradesh as it faces the fury of one or the other disaster every year. The fragile ecology and geology of the State coupled with large variations in Physio-climate conditions render it vulnerable to vagaries of nature in one way or the other.

Table 2.1 District-wise Hazard Threat in Himachal Pradesh

District	Earthquake	Landslide	Floods	Avalanche	Forest Fire	Drought	Cloud Burst
Kangra	VH	L	M	M	H	H	M
Chamba	VH	VH	H	M	H	M	H
Hamirpur	H	L	L	-	VH	M	L
Mandi	VH	H	H	-	VH	M	H
Kullu	VH	VH	H	H	H	M	VH
Bilaspur	H	M	L	-	VH	M	L
Una	H	L	H	-	M	H	L
Sirmour	H	L	L	-	VH	M	M
Solan	H	M	L	-	M	M	L
Kinnaur	H	H	H	VH	M	M	VH
Lahaul & Spiti	M	M	M	VH	M	M	H
Shimla	VH	H	H	M	H	M	H



A view of Shimla city

Topographically when seen the elevations in the State ranges from less than 1000m in the valleys and in areas adjoin the Punjab plains to as high as 3500 meters and above in the Alpine Zone. Due to topographical, metrological and geological variability across the state the incidence of cloud bursts, flash floods, avalanches, draughts, and other natural calamities hit the State often. In the disaster prone map of the country, Himachal Pradesh has attained its position among first five states in respect of hazards such as earthquakes, flash floods, landslides, avalanches and forest fires.

We recognize the inevitability of the hazard risk increasing with population pressure and consequent anthropogenic interference besides the lack of awareness and preparedness. Some of the common natural and manmade disasters experienced in State are follows:

Water and Climate Related Hazards:

- Cloud Bursts
- Hailstorms
- Cold Waves
- Snow Avalanches
- Droughts
- Thunder and lightening
- Floods
- Snow Storms

Geologically Related Disasters:

- Earthquake
- Landslide
- Rock Falls
- Land Subsidence
- Land Erosion
- Dam Failures/Lake bursts

Chemical and Industrial Disasters:

Specific to industrial belts (Nalagarh, Mehatpur, Baddi-Barotiwala, Kala-Amb and Paonta Sahib)

- a) Industrial Fires
- b) Gas & Chemical Leakages

Accidents Related Disasters:

- a) Forest fires
- b) Electrical fires
- c) Urban fires/ Village fires
- d) Building Collapses
- e) Festival / Fair / Temple Stampedes
- f) Road accidents / rail accidents
- g) Boat capsizing

Biologically Related Disasters:

- a) Epidemics
- b) Pest attacks
- c) Food poisoning
- d) Water Contamination
- e) Cattle epidemics

Emerging Threats-

Climate induced Hazards:

- a) Glacial Lake Outburst Floods (GLOF)
- b) Landslide Dam Outburst Floods(LDOF)
- c) Flash Floods

Man and animal conflict:

- a) Monkey Menace

2.2 Past Disasters & Lessons Learnt

From the multiple disasters the State has experienced over the years the lessons learnt could be enumerated as follows:

- Experience of Kinnaur earthquake of 1975 and Kashmir earthquake of 2005 suggest that the collapse of building was the dominant cause for the loss of life. Conventional unreinforced masonry laced with timber performed satisfactory during 2005 Kashmir and 1975 Kinnaur earthquakes. Hence there is urgent need to ponder over the efficacy of modern designs of buildings and engineering models being practiced in hills. The designs being adopted on the analogy of the plains are not suitable and should not be replicated in the hills.
- Information regarding construction of earthquake resistant houses is not easily available to a common man.
- At the time of disasters either the affected inhabitants or the villagers living in close vicinity of the disaster areas that came for the immediate rescue. Anyone else including the Govt. machinery was the next to reach. In road accidents when buses rolled down into the deep gorges retrieval of dead bodies turned out to be a challenge for police as well as for the Army. In such situations the local people particularly youth proved to be the most useful support as they could only negotiate the steep slopes in absence of visible foot traces. Similarly during the year 2000 floods in Satluj the only bridge that survived with minimum damage was Akapa bridge .One of the abutment of this bridge was washed away and required immediate repair to protect it from further damage. GREF the agency responsible for its upkeep had no manpower available to undertake this job immediately for restoring the communication .Appreciating the urgency of the matter the villagers from Ribba, Rispa, and Rarang shouldered the responsibility by way of *sharamdan* and protected the bridge from further damage. Contributions of local people in restoration of Rukling helipad were also exemplary.
- It is not enough to train Engineers and Architects in the design of earthquake resistant houses, Masons and carpenters have also gradually lost the basic knowledge & skills which were traditionally incorporated even when undertaking constructions at the village level. It is therefore necessary that practical and hands on training are organized for the Masons and Wire binders in the safe construction of houses.
- Luggar Bhatti mishap in Kullu suggest that geological considerations are required to be given high weighting while under taking construction of roads and other major construction projects. Landslide and other disastrous slope failures have taken place when geological and geomorphologic factors were overlooked, especially in geologically fragile terrains.
- Notwithstanding the fact that national and state level authorities have been constituted for effective coordination amongst various organizations involved in the disaster management yet lack of coordination became evident during the Parechu crisis. The report of Deputy Commissioner Kinnaur eloquently highlights the inadequacy on the desired coordination. As per his observations the central agencies like GREF, Army, Air force, were not very sensitive to local requirements. Generally all these agencies have a set pattern/protocol of working which is inflexible. For example Air Force helicopters would not land on the make shift helipads to evacuate the dying patients where a state helicopter pilot will do the same readily. Army had a large reserve of petrol, diesel and kerosene oil with them in the district which they could have given on loan to the district administration. But it needed clearance from command headquarters wasting about 10 days before the same could be done. GREF had a huge shortage of blasting material in upper areas of Kinnaur but they would not transport it via old HT road as they were only authorized to do so via NH 22. There is a need for these agencies to be more flexible in tackling such disaster situations.
- Disaster Management Plans even though available as office documents yet are not practical & useful at the time of crisis. District administration is ill equipped and inadequately trained to

deal with disaster situation. Absence of an organized mechanism is generally felt at the time of crisis.

- At the time of Kinnaur earthquake that happened during winter time accessibility to villages & families living in higher altitudes was a major constraint and challenge for the administration while protecting affected families from cold weather and providing relief to the victims. Hence dealing with harsh climate and freezing temperature during winter season would be a challenge in high altitude areas of Kinnaur, Shimla, Kullu, Mandi, Lahaul Spiti & Kangra districts. Even during Kashmir earthquake of 2005 relief efforts were hampered on account of heavy snowfall and heavy rains that followed the post earthquake period. The shelter that was provided in the form of tents proved highly inadequate in protecting people from rain and freezing temperature. The lesson underscores the need for procuring adequate numbers of winterized tents and preparing high altitude specific strategy.
- There are many loopholes in assessing the quantum of damage in case of property of the victims. The power of assessment of the loss is vested with the junior officials of the various departments especially in the revenue department. Wide discretion is left at the hands of Patwari/Kanungo to assess the loss of dwellings, houses, cow sheds, crops and other properties. This discretion is liable to be discriminatory in cases where the assessors have no specialize training for assessing such damages. It is, therefore suggested that for damage and loss assessment technical persons should be associated with the team.
- Existing norms for relief distribution proved to be inadequate for providing relief to the victims of bus accidents in situations when they were from outside the state.
- Relief manual does not take into account various expenses that have to be borne during the disaster events like helicopter flights etc., Relief for agriculture and horticulture crops in the NCCF guidelines is not at all commensurate with the losses suffered by the farmers. Land development costs prescribed have also been found inadequate.
- Forewarning of an event like impending flood or bursting of a water body in the higher catchment areas could save precious lives. This again was amply demonstrated during the Parechu Crisis. Establishing advance automatic warning system in inaccessible parts of the catchments areas on a permanent basis is highly desirable.
- Kuhls & water channels providing irrigations to the agriculture fields in the mountain areas and especially in Kangra District are liable to damage in the wake of disaster. This was amply demonstration during Kangra earthquake of 1905.
- Whether it is a large scale or localized disaster such as avalanche, cloud burst or landslide, the connectivity limiting accessibility to the affected people and areas is the major handicap likely to be encountered in mountain terrain. Even during Kangra earthquake all roads were blocked, bridges and retaining walls collapsed, landslide brought down number of rocks & boulders disrupting and interrupting seriously the communication to the affected villages & towns. When connectivity & accessibility is interrupted the immediate consequence is hoarding of all kinds of goods by those who could afford to buy them in cash. This results in creating shortage of essential goods of daily need. During the year 2000 floods in Satluj valley when the people of Reckong Peo came to know about washing away of NH-22 linking the town with rest of the state the goods in shops and stores vanished within 2 hours, causing sleepless nights for the administration and untold miseries to the poor.
- Traditional wisdom is an important asset which required be documented, preserved and propagated. Dr. Man Singh a HAS Officer during his posting as Tehsildar in Pooch sub division of Kinnaur district had an interesting experience to narrate. One day when the sky was very clear he decided to tour the Yang Thang area in connection with his official work. While he was about to leave he was warned by a local shopkeeper (Medup Dandup) to be watchful as it was likely to snow heavily on that day in the area he had planned to travel. The officer laughed away the idea as the sky was clear and there were no reasons for him to be affright of weather.

He undertook the journey as planned. To his surprise as the day progressed the weather started turning from bad to worse. Sensing the truth in the prophecy of the shopkeeper he rushed back to his residence only to be stranded on the way as the road was blocked by a helicopter which had a forced landing on the road. Next day returning back to the headquarters at Pooh the officer impressed by the wisdom of the shopkeeper enquired from him the reasons that prompted him to make such an accurate prediction. The shopkeeper informed him that typical sound of **blowing wind** and the **birds** indicate the likely weather conditions and he only used it. This knowledge was transferred to him by his ancestors and he had successfully used it over the years. Capt. J.M. Pathania the then ADM of Pooh narrates another experience highlighting that how overlooking local knowledge and wisdom could turn out to be a costly affair. During 2000 flood when alignment between Akpa & Karo bridges was damaged the GREF decided to revive the old Khadra Dhank alignment. The community opposed the decision and warned that this will not be a practical idea; instead they suggested reviving the old HT road. Ignoring the concerns and perceptions of the local people the GREF decided to continue with their decision. Unfortunately the idea did not work and after wasting two months of precious time and scarce resources the GREF had to abandon the work and use the old HT road for transporting the produce. These experiences underscores the necessity of documenting the traditional wisdom available with community on such a vital topic of disaster forewarning especially from tribal and land locked pockets of the state.

- Even though the facility of **108 ambulances** has proved very effective and useful in saving the lives of people yet its mobility and effectiveness is greatly hampered during snow fall in Shimla city. During the months of January and February when the city was under snow cover during this year (2012) plying of ambulances was limited to certain stretches only and the patients could not be taken up to the IGMC the state hospital. The ambulances are not equipped to negotiate slithering roads during snow fall as a result the patients were taken on shoulders with high risk and difficulty. This experience underscores the necessity of providing required gadgets to ambulances for dealing with specific situation arising due to climatic specificities in the state.
- The concern for disaster mitigation is generally very high when the calamity has struck and invariably the concern is limited to debates and discussions. As a result at the time of each calamity the situation remains the same as prior to it.
- Though we may not be able to avoid the occurrence of Natural Hazards yet with proper planning, we can mitigate its impact.

2.3 Brief Overview of Major Hazards

2.3.1 Seismic Hazard

The seismic sensitivity of the state of Himachal Pradesh is very high as over the years a large number of damaging earthquake has struck the state and its adjoining areas. Seismically it lies in the great Alpine Himalayan belt running from Alps Mountain through Yugoslavia, Turkey, Iran, Afghanistan, Pakistan, India, Nepal, Bhutan and Burma. Due to its location the state experiences dozens of mid earthquakes every year. Large earthquakes have occurred in all parts of Himachal Pradesh, the biggest being the Kangra earthquake of 1905. The Himalayan Frontal Thrust, the Main boundary Thrust, the Krol, the Giri, Jutogh and Nahan thrusts are some of the tectonic features that are responsible for shaping the present geophysical deposition of the state.

The seismic vulnerability of Himachal Pradesh is primarily attributed to northward movement of Indian plate and to the major dislocation tectonic features such as MBF, MBT, Punjab thrust and MCT etc. Besides the longitudinal tectonic feature trending parallel to the Himalayas there are a large number of transverse fractures, faults that have been responsible for the seismic activity in the Himalayan region in general and Himachal Pradesh in particular. The Kinnaur earthquake of 1975 was associated with transverse Kaurik fault. In fact about 250 earthquakes with magnitude 4 and 62 earthquake having magnitude of 5 and above have impacted the state so far. It is also pertinent to

note that the state of Himachal Pradesh is not only highly sensitive from the earthquake point of view but the risk has also grown many folds as the population and infrastructure have increased considerably over the last 20 years.

Chamba, Kullu, Kangra, Una, Hamirpur, Mandi and Bilaspur Districts lie in Zone V i.e. very high damage risk zone and the area falling in this zone may expect earthquake intensity maximum of MSK IX or more. The remaining districts of Lahaul and Spiti, Kinnaur, Shimla, Solan and Sirmour lie in Zone IV i.e. the areas in this zone are in high damage risk with expected intensity of MSK VIII or more. The spatial distribution and district wise history of past seismic events is given as below.

Table 2.2 District-wise occurrence of Earthquakes (1800-2008)

No.	District	Number of earthquakes	Percentage of Total
1	Chamba	186	33.63
2	Lahaul & Spiti	99	17.90
3	Kinnaur	93	16.82
4	Mandi	53	9.58
5	Shimla	49	8.86
6	Kangra	39	7.05
7	Kullu	19	3.44
8	Sirmaur	8	1.45
9	Solan	4	0.72
10	Hamirpur	2	0.36
11	Bilaspur	1	0.18
12	Una	0	0.00
	Himachal Pradesh	553	100

Source: Vishwa, B. S. Chandel & Karanjot Kaur Brar

Some of the important earthquakes that the state experienced and for which instrumental records are available are as follows:

- 4rd April 1905 – Kangra (Mw 7.8)**
 33N, 76E, OT= 00:50 UTC
 About 20,000 people were killed in the Kangra- Dharamshala region. Damage and casualties also occurred in adjoining parts of Punjab including in the cities of Amritsar, Lahore, Jalandhar, Ludhiana and Sialkot.
- 28th February 1906 – Near Kullu (Mw 6.4)**
 32N, 77E
 Damage and casualties in the Bashahr – Shimla hills states.
- 11th May 1930 – East of Sultanpur, 6.0 (TS)**
 11:30:36 UTC, 31.70N, 77.00E
- 22 June 1945 – Near Padua Kathwa District, J&K (H.P, J&K Border region), 6.0 (TS)**
 18:00:51 UTC, 32.5999N, 75.90E
- 10th July 1947 – Near Padua, Kathwa District, J&K(H.P, J&K Border region), 6.0 (TS)**
 10:19:20 UTC, 32.599N, 75.90E
- 12th August 1950 – Near Padua, Kathwa District, J&K(H.P, J&K Border region), 6.0 (TS)**
 (TS) 03:59:06 UTC, 32.599N, 75.90E
- 12th September 1951 – Chamba – Udhampur Districts (H.P-J&K Border region), 6.0 (TS)**
 20:41:48 UTC, 33.30N, 76.50E

- **17th June 1955 – Lahaul Spiti District (Himachal Pradesh), 6.0 (TS)**
10:14:09 UTC, 32.50N, 76.60E
- **17th June 1962 – Chamba-Udhampur Districts (H.P-J&K border region), 6.0 (TS)**
04:39:26:60 UTC, 33.30N, 76.20E
- **19th January 1975 – SW of Dutung, Himachal Pradesh (Indo-China Border region), Ms6.8 (NEIC)**
08:02:02:05, 32.455N, 78.430N, 33Kms depth
This earthquake struck in the early afternoon of Jaunary 19, 1975. It registered 6.2 on the Richter Scale. It caused havoc in parts of the Kinnaur, Lahaul and Spiti regions of India, 60 people were killed in this sparsely populated region.
- **11th November 2004 – Bharmour, Kangra region, Mb 5.1**
32.442 N, 76.512 E, D=34Kms, OT=02:13:45 UTC
A moderate earthquake struck the Kangra Valley and the Dhauladhar Mountains on 11th November, 2004 at 07:43 AM local time. It was felt strongly in the Kangra-Dharamshala region and event caused minor damage to buildings in this region. It had a magnitude of Mb=5.1

Source: www.asc.india.org

The seismic record for the last 100 years coupled with continued occurrence of moderate to large earthquakes is an eloquent testimony of the seismic potential of the state of Himachal Pradesh. Even though the earthquakes are generally considered to be rare low probability events with recurrence periods of the order of several decades yet they pose extremely high risk to the society as much of the structural damage takes place within a few seconds. The past earthquake also indicates that the impact of earthquake was not uniform but varied from place to place on account of ground vibration and site amplification. Apart from the ground motion characteristics, the geotechnical properties and characteristics of soil and rocks plays an important role in controlling the structural damage during such events. The vulnerability of built up structures by following seismic codes prescribed from time to time to withstand the impact of such geophysical heterogeneities is highlighted by the building census and topology studies given by BMPTC.

Table 2.3 District-wise area under Seismic Zones V and IV

No.	District	Area under Seismic Zone V (%)	Area under Seismic Zone IV (%)
1	Kangra	98.80	01.20
2	Mandi	97.40	02.60
3	Hamirpur	90.90	09.10
4	Chamba	53.20	46.80
5	Kullu	53.10	46.90
6	Una	37.00	73.00
7	Bilaspur	25.30	74.70
8	Lahaul & Spiti	02.14	97.86
9	Shimla	00.38	99.62
10	Solan	01.06	98.94
11	Sirmaur	Nil	100
12	Kinnaur	Nil	100
	Himachal Pradesh	32.02	67.98

Source: Vishwa, B. S. Chandel & Karanjot Kaur Brar

Table 2.4 Earthquake Distribution (1800-1900)

No.	Date (Year, Month, Day)	Magnitude (MM)	District
1	1803 09 01	VII-VIII	Sirmaur
2	1842 03 05	IV-VI / VII	Shimla
3	1856 04 07	VII-VIII	Shimla
4	1856 04 07	IV-V	Kangra
5	1856 04 07	III-V	Shimla
6	1858 08 11	VII-VIII	Shimla
7	1860 07 09	V	Kangra
8	1865 04 11	VI-VII	Shimla
9	1865 12 04	VI-VII	Kangra
10	1868 11 16	-	Shimla
11	1869 10 05	V	Shimla
12	1878 03 02	V-VI	Kullu

Source: Vishwa, B. S. Chandel & Karanjot Kaur Brar

Table 2.5 Earthquake Distribution (1900-1963)

No.	Date (Year, Month, Day)	Magnitude (Mb)	District
1	1905 04 04	8.0	Kangra
2	1906 02 28	7.0	Kullu
3	1914 10 09	6.1	Chamba
4	1917 05 09	-	Lahaul & Spiti
5	1929 01 14	-	Sirmaur
6	1930 05 11	5.5	Mandi
7	1940 04 07	-	Mandi
8	1945 06 22	6.5	Chamba
9	1947 07 10	6.2	Chamba
10	1947 07 10	-	Chamba
11	1950 08 12	5.5	Chamba
12	1950 09 25	-	Lahaul & Spiti
13	1950 10 06	-	Kullu
14	1951 09 12	-	Chamba
15	1951 09 15	-	Chamba
16	1955 03 10	-	Chamba
17	1955 04 14	-	Chamba
18	1955 06 27	-	Kinnaur
19	1962 09 15	5.5	Kangra
20	1963 04 12	5.4	Kinnaur
21	1963 11 12	4.6	Kinnaur

Source: Vishwa, B. S. Chandel & Karanjot Kaur Brar

Himachal Pradesh: Earthquake Epicenter Distribution (1800–2008)

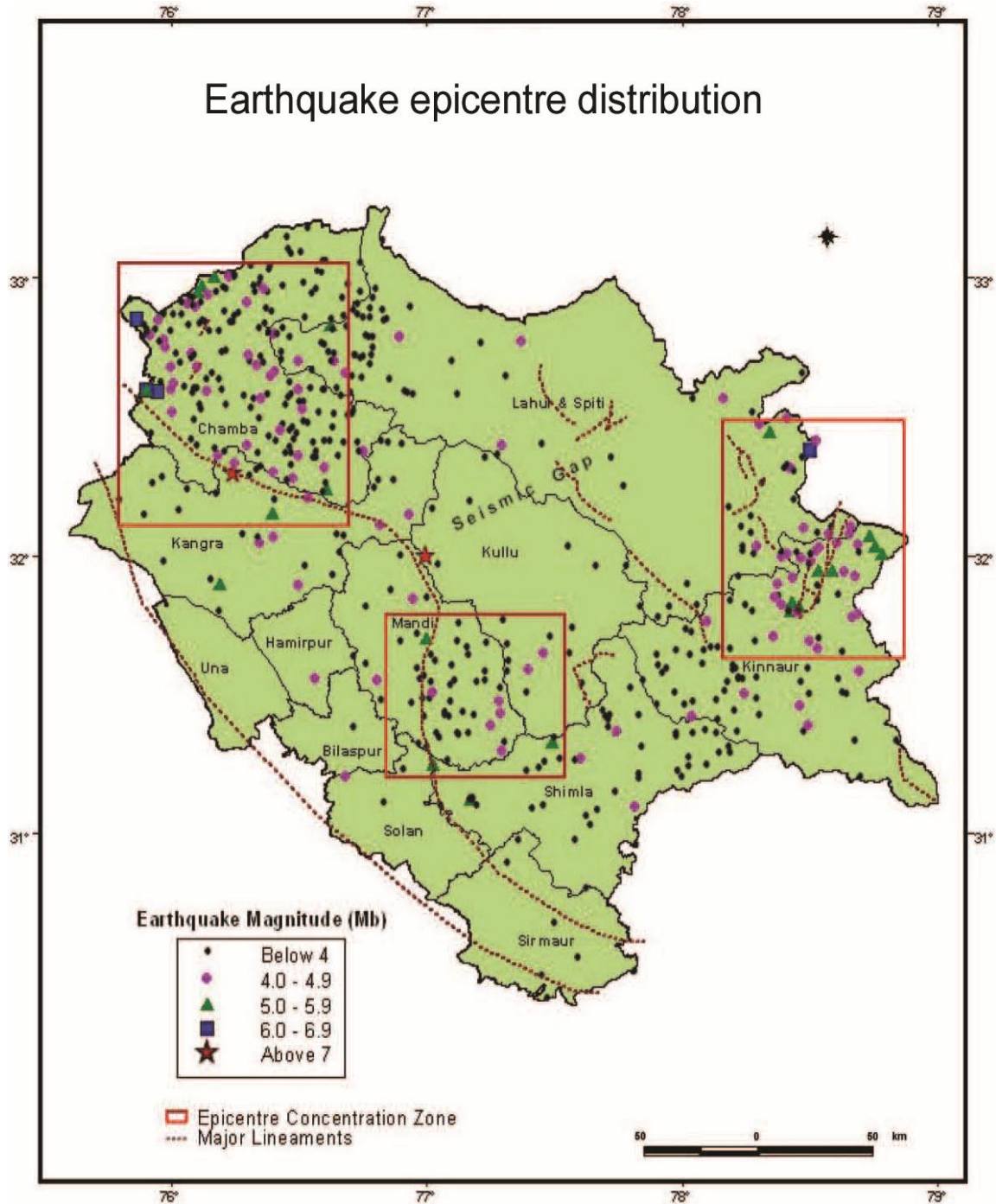


Figure 2.2 Earthquake Epicenter Distribution (1800–2008)

Source: Vishwa, B. S. Chandel & Karanjot Kaur Brar

Both population and demand on allied infrastructure to meet the requirements of housing, water, power, transport, etc have rendered almost all the towns in the state vulnerable to high seismic risks. Since prognosis of seismic hazard plays key role in planning and protecting buildings, life lines, industries and other safety sensitive structures, estimation and quantification of future ground vibration is required to be carried out immediately. This is more urgent as maps depicting seismic scenario in the state of Himachal Pradesh indicates that very high seismic risk zones are also the areas characterised with dense population and heavy infrastructure. This is quite frightening when viewed in the backdrop that probability of a major earthquake striking the state is looming large.

The Earthquake Hazard Map of BMTPC, 2006 shows that Himachal Pradesh falls in one of the highest risk zone areas of the state (Zone IV & V).

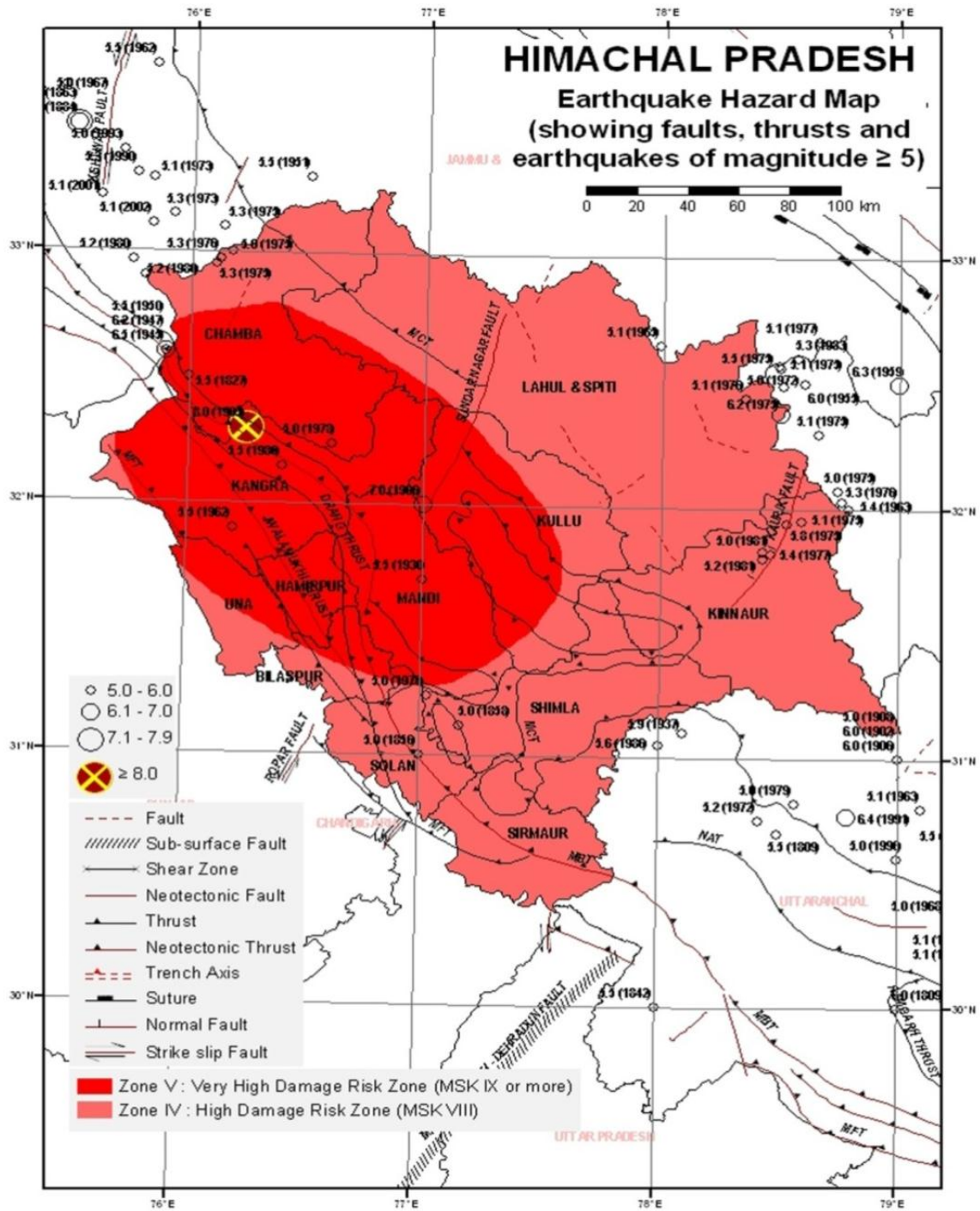


Figure 2.3 Earthquake Hazard Map of Himachal Pradesh

(Source: BMTPC Atlas of India)

Table 2.6 Impact of earthquake suffered by Himachal Pradesh in past 100 years

Date	Locations affected	Magnitude / Intensity	Damage
4 April, 1905	Kangra	Magnitude 8.0	Approx. 19,800 people died in Kangra District.
28 February, 1906	Shimla	Magnitude 6.5	26 people died, 45 severely injured
19 January, 1975	Kinnaur	Magnitude 6.8	60 people died, 2000 dwellings housing devastated
26 April, 1986	Dharamshala	Magnitude 5.5	6 people died, Extensive damage to buildings
April, 1994	Chamba	Magnitude 4.5	Area at risk was Chamba town
24 March, 1995	Chamba	Magnitude 4.9	Fearsome shaking, More than 70percent houses faced cracks
July, 1997	Sunder Nagar	Magnitude 5.0	Some part of Sunder Nagar affected

Source: State of Environment Report Himachal Pradesh

ELEMENT AT RISK

Houses, Buildings, Heritage buildings, Schools, Hospitals, Power Projects and population

2.4 Landslides

Landslide is the most common hazard in Himachal Pradesh, which causes immense risk to life and property. Almost every year the state is affected by one or more major landslides affecting the society in many ways. Loss of life, damage of houses, roads, means of communication, agricultural land, are some of the major consequences of landslides. The fragile nature of rocks forming the mountains, along with the climatic conditions and various anthropogenic activities has made the state vulnerable to the Landslides.

District wise landslide vulnerability in the State is as follows.

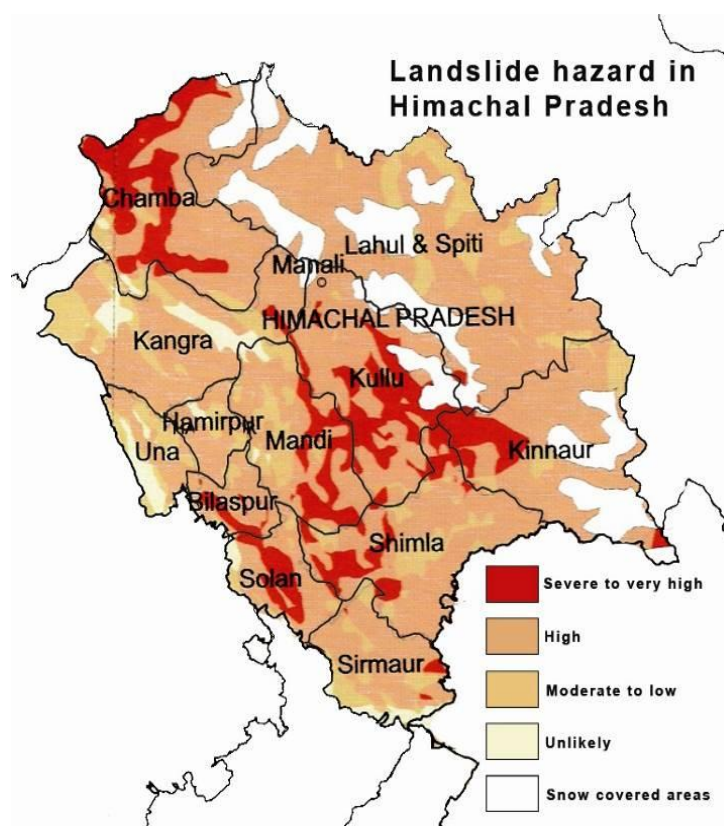


Figure 2.4 Landslide Hazard in Himachal Pradesh

Table 2.7 Landslide Vulnerable areas in Himachal Pradesh (District area in square kilometres)

District	Severe to very high	High	Moderate to low	Unlikely	Total area
Bilaspur	216	842	83	1	1142
Chamba	2120	3829	351	70	6370
Hamirpur	0	851	204	45	1100
Kangra	123	3698	1233	557	5611
Kinnaur	868	4956	498	0	6322
Kullu	1820	3513	65	3	5401
Lahaul & Spiti	127	11637	1825	2	13591
Mandi	968	1978	826	98	3870
Shimla	893	3345	767	14	5019
Sirmaur	95	1805	614	228	2742
Solan	556	1118	157	79	1910
Una	2	678	517	311	1508

Triggering of landslides is both a natural and anthropogenic phenomena. As in other parts of Himalayas the landslide activity in Himachal Pradesh also varies with altitude, geology and topography. Various geophysical factors such as steepness of slopes, saturation by heavy rains, melting snow and ice, rock vibrations, excess load from embankments, fills, waste & debris dumps change in water content, frost, change in vegetable cover and toe cutting by rivers and streams are some of the other natural factors influencing the occurrence of landslides. The vulnerability of course has increased many times in the recent past due to various developmental activities. Deforestation, unscientific road construction, terracing, water intensive agricultural practices, and encroachment on steep hill slopes are some of the anthropogenic factors that have contributed towards increased intensity and frequency of landslides. Jhakri, Pangi, Powari, Urni, Sholdan, Nichar, Khadra Dhank, Thangi, Barua are some of the most common landslide that has affected the NH-22 in Satluj valley.

Some of the road sections with recurring and vulnerable landslide phenomena are as given below:

Table 2.8 Roads and Landslides

District	Road	Route	Vulnerable Locations/ Trouble spots	Contact of Nodal Person
Chamba	SH-33	Pathankot-Banikhet-Chamba Road	<ul style="list-style-type: none"> Bandhla Sector Dunera-Tanu hati NaniKhad-Bani Khad Sector Parel Sector 	SE PWD 01899-240606
	SH-35	Bathri-Sundla-Langera-Jammu boundary road		
	Strategic Road	SH-35 Bathri-Sundla-Langera-Jammu boundary road		
Hamirpur	NH-70	Jalandhar-Hoshiarpur-Gagret-Mubarkpur-Amb- Nadaun-Hamirpur-Tonidevi-Awahdevi-Tihra-Dharampur-Kolti-Mandi	<ul style="list-style-type: none"> Amb-Jawar-Kaloh Sector Dharampur-Kotli Sector 	SE,PWD 01972-223965(O) 01972-222228(R)

		Road		
	NH-88	Shimla-Brampukhar-Ghagus-Hamirpur-Nadaun-Ranital-Kangra-Mator Road		
	SH-32	Una-Aghar-Bhambla-Rewalsar-Mandi Road		
	SH-39	Hamirpur-Sujanpur-Thural-Maranda Road		
Kangra	NH-20	Pathankot-Chaki-Mandi Road	<ul style="list-style-type: none"> • Trilokpur Sector • Paprola-Gumma Sector 	SE, NH 01892-238663(O) 01892-239311(R)
	NH-88	Shimla-Bramhpukhar-Ghagus-Hamirpur-Nadaun-Ranital-Kangra-Matour Road	<ul style="list-style-type: none"> • Ranital-Kangra Sector 	SE,PWD 01892-223189(O) 01892-226264(R)
	SH-27	Pong Dam-Reh-Dhameta-Nurpur-Malikwal-Chamba Road		
	SH-39	Hamirpur-Sujanpur-Thural-Maranda Road		
	Strategic Road	Pong Dam-Reh-Dhameta-Nurpur-Malikwal-Chamba Road		
Kullu	NH-21	Chandigarh-Mandi-Manali-Leh Road	<ul style="list-style-type: none"> • Between Kullu-Manali at km 271,292, 293,297 and 306 • Rahla-Kothi Sector 	SE, PWD 01902-222530(O)
	SH-11	Sainj-Luhri-Banjar-Aut Road	Jalori Sector	
	Strategic Road	NH-21 Chandigarh-Mandi-Manali-Leh Road		
Mandi	NH-20	Pathankot-Chakki-Mandi Road	Gumma Sector	Chief Engineer 01905-224850(O) 01905-224851(R)
	NH-21	Chandigarh-Mandi-Manali-Leh Road	Mandi-Pandho Sector Hanogi Sector	SE,PWD 01905-224129 Mob: 94180-94562
	SH-13	Shimla-Manali via Tatapani Road		
	SH-19	Ghumarwin-Sarkaghat & Jogindernagar Road	Dharampur-Ladbhadol Sector	
	SH-32	Una-Aghar-Bhambla-Rewalsar-Mandi Road		
	Other Roads	Sainj-Luhri-Karsog-Sundernagar Road		
	Strategic Road	NH-21 Chandigarh-Mandi-Manali-Leh Road		
Bilaspur	NH-21	Chandigarh-Mandi-Manali-Leh	<ul style="list-style-type: none"> • Swarghat-Gambar Bridge Sectors km 98,99 & 166 • Manali-Pandoh Sector • Rahla-Kothi Sector • Gramphu-Sisu Avalanche prone 	SE, PWD 01978-223466(O) 01978-223848(R)

			<ul style="list-style-type: none"> • Jispa-Keylong sector Avalanche prone • Patsio-Baralacha Avalanche prone 	
	NH-88/SH-27	Shimla –Brampukhar-Ghagus-Hamirpur-Nadaun-Ranital-Kangra-Matour Road	<ul style="list-style-type: none"> • Sarkaghat-Dharampur • Dharpur-Ladbharol 	
	SH-19	Ghumarwin-Sarkaghat-Jogindernagar Road		
Una	NH-70	Jalladhar-Hoshiarpur-Mubarkpur-Amb-Nadaun-Hamirpur-Taunidevi-Awah devi-Tihra-Dharampur-Kotli-Mandi Road	Jawara Sector	SE, PWD 01975-228883(O) 01975-225882(R)
	SH-32	Una-Aghar-Bhambla-Rewalsar-Mandio Road		
Solan	NH-21	Pinjore-Nalagarh-Swarghat Road	Dedgharat-Salogra sector	SE, PWD 01792-220675 Mob: 94184-76672
	NH-22	Ambala-Kalka-Shimla-Kaurik Road		
	NH-88	Shimla-Brahmpukhar-Ghagus-Hamirpur-Nadaun-Ranital-Kangra-Mataur Road		
	SH-02	Kumarhatti-Kala amb via Banog Trilokpur temple Road		
	SH-16	Shimla-Kunihar-Ramshehar- Nalagarh HP Boundary Road		
	Strategic Road	NH-21 A Pinjore-Nalagarh-Swarghat Road		
Kinnaur	NH-22	Ambala-Kalka-Shimla-Kaurik Road	Salogra- Dedgharat Sector	EE 01786-226027(O) 01786-226028(R)
	SH-30	Gramphoo-Rangrik-Samdoo Road	Rampur-Jeori-Nalhapa Sector	
	Strategic Road	NH-22 Ambala-Kalka-Shimla-Kaurik Road NH-30 Gramphoo-Rangrik-Samdoo Road	<ul style="list-style-type: none"> • Jhakri Sector- Solding Nala at km 283, 286, 329 • Katcham-Pawari Sector • Kelong-Pooh Sector • Khab-Leo-Nako-Mulang Sector • Chago-Samdoh • Avalanche and Land Slide 	
Lahaul & Spiti	NH-21	Chandigarh-Mandi-Manali-Leh Road	Gramphu-Sisu Avalanche prone	AE 01900-222276(O) Mob: 9418765972

	Strategic Road	Rohtang-Keylong-Leh-Udaipur-Killar road.	Jispa-Keylong
	Border Roads	Gramphoo-Loasr-Rangrik-Kibber Road Manali-Gramphoo-Keylong-Leh Road Rangrik-Samdhoo Road All are strategic roads also	Patsio-Baralacha Avalanche Prone Keylong-Udaipur-Killar Sector Avalanche Prone
Shimla	NH-22	Ambala-Kalka-Shimla-Kaurik Road	Rampur-Leori Sector
	NH-88	Shimla-Brampukhar-Ghatus-Hamirpur-Nadaun-Ranital-Kangra-Matour Road	
	SH-01	Lal Dhank-Paonta-Rajban-Sungri-Narkanda	Sungri-Narkanda Sector
	SH-13	Shimla-Mandi via Tatapani Road	
	SH-16	Shimla-Kunihar-Ramshehar-Nalagarh HP Boundary Road	
	Strategic Road	SH-1 Lal Dhank-Paonta-Rajban-Sungri-Narkanda	
Sirmaur	NH-72	Ambala-Narayangarh-Kala amb-Paonta-Dehradun-Rishikesh-Haridwar Road	
	SH-01	Lal Dhank-Paonta-Rajban-Rohru-Sungri-Narkanda Road	Rajban-Rohru & Sungri-Narkanda Sector
	SH-02	Kumarhatti-Kalaamb via Banog-Trilokpur Temple Road	Naina-Tikkar Sector

Experts point out that unscientific land use and unplanned expansion of urban areas is also overloading and destabilising the slopes in the towns and cities such as Shimla. Overloaded slopes may initially cause only minor landslides, but at later stage could trigger larger landslides. The state capital Shimla is also sinking at several places due to digging of slopes for construction and infrastructure development. First major landslide occurred in Shimla in February 1971 when a large northern portion of the Ridge slumped down threatening the safety of reservoirs below. Since then many areas of the town have become prone to landslides and situation worsens during rainy season when vulnerable roads are washed away at many places.



Table 2.9 Major Landslides that caused heavy damage in the past

Location/ Highway	Year of Occurrence		Damage to highway
	First	Last	
NH-22	1988	1995	During the flood, of 1988, 1993 and 1995, 250, 350 and 475 m of the road was washed away.
NH-22 km 292-293	1988	1995	During the flood of 1988, 1993 and 1995, 200, 500 and 300 m of the road was washed away.
NH-22 km 307	1988	1995	During the flood of 1988, 1993 and 1995, 100, 150 and 600 m of the road was washed away.

Flash floods, particularly in narrow river gorges are also responsible for triggering the major landslides in Himachal Pradesh. Some of the flash floods triggered landslides are as follows:

Table 2.10 Major Landslides due to flash floods

Name of Landslide	Year	Description
Jhakari	1993	Road (NH-22) stretch of about 1/2 km was completely damaged and slide debris blocked the river Sutlej. Traffic restored after two months.



ELEMENTS AT RISK

Bridges, Settlements, Power projects, Forest trees, Agriculture land etc.

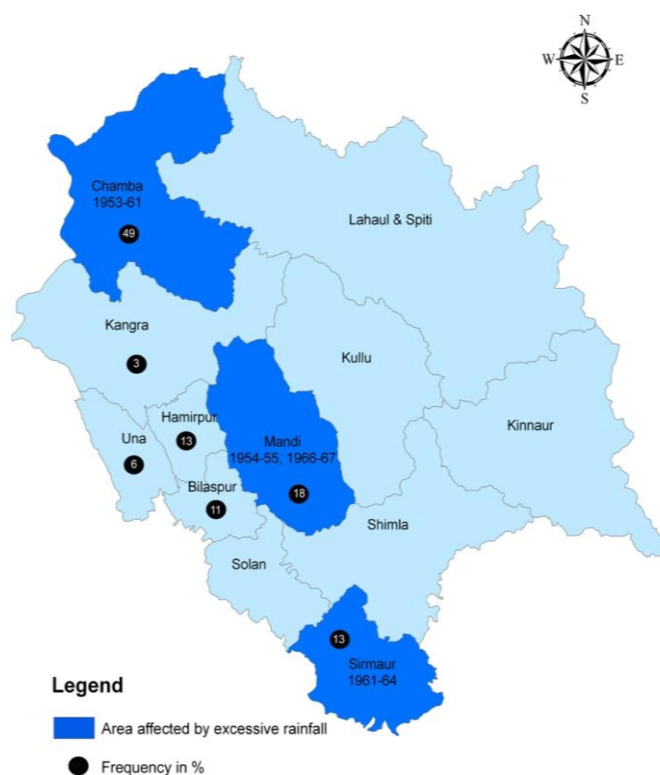
2.5 Floods

Floods are another form of natural disaster the State experiences every year. South west Monsoonal rainfall during the months of June to August is the dominant cause for triggering floods when rainfall happens to be in excess i.e. 125% or more than the normal. Fig 2.5 shows the percentage frequency of excessive rainfall and successive years of excessive rainfall during the period from 1951 to 1999. During this period the Chamba district in the north western part of the state had received highest amount of rainfall expressed as percentage of the normal with more numbers of successive years of excessive rainfall. Table 2.11 gives the district wise excessive rainfall years and highest annual rainfall expressed as percentage of normal and Table 2.12 gives successive years of excessive rainfall. Fig 2.6 is the map of flood prone areas as prepared by Dr D.D Sharma of H.P University Shimla.

Table 2.11 Years of Excessive Rainfall

Sr. No.	Districts	Years of excessive Rainfall > 125%	Highest amount of rainfall expressed (as % of the normal with year)
1.	Bilaspur	1973, 94, 96, 98	218.7 cm in 1998 (174 %)
2.	Chamba	1953, 54, 55, 56, 57, 58, 59, 60, 61, 64, 76, 77, 79, 88, 92, 93, 94	268.3 cm in 1977 (198 %)
3.	Hamirpur	1955, 61, 70, 90	210.6 cm in 1990 (144%)
4.	Kangra	1976	233.4 cm in 1976 (126 %)
5.	Mandi	1954, 55, 63, 66, 67, 88, 90, 97	336.4 cm 1988 (215 %)
6.	Sirmaur	1959, 61, 62, 63, 64, 88	288.8 cm in 1963(215%)
7.	Una	1955, 88	237.0 cm in 1988 (196 %)

Data Source: Indian Meteorological Department (IMD)

AREA AFFECTED BY EXCESSIVE RAINFALL (1951-2000)**Figure 2.5 Area affected by excessive rainfall (1951-2000)**

Data Source: Indian Meteorological Department (IMD)

Table 2.12 Successive Years of Excessive Rainfall (District-wise)

Sr. No.	District	Successive years of excessive rainfall
1.	Chamba	1953-54-55-56-57-58-59-60-61, 1976-77, 1992-93-94.
2.	Mandi	1954-55, 1966-67
3.	Sirmaur	1961-62-63-64

Data Source: Indian Meteorological Department (IMD)

Himachal Pradesh

Flood Disaster Map

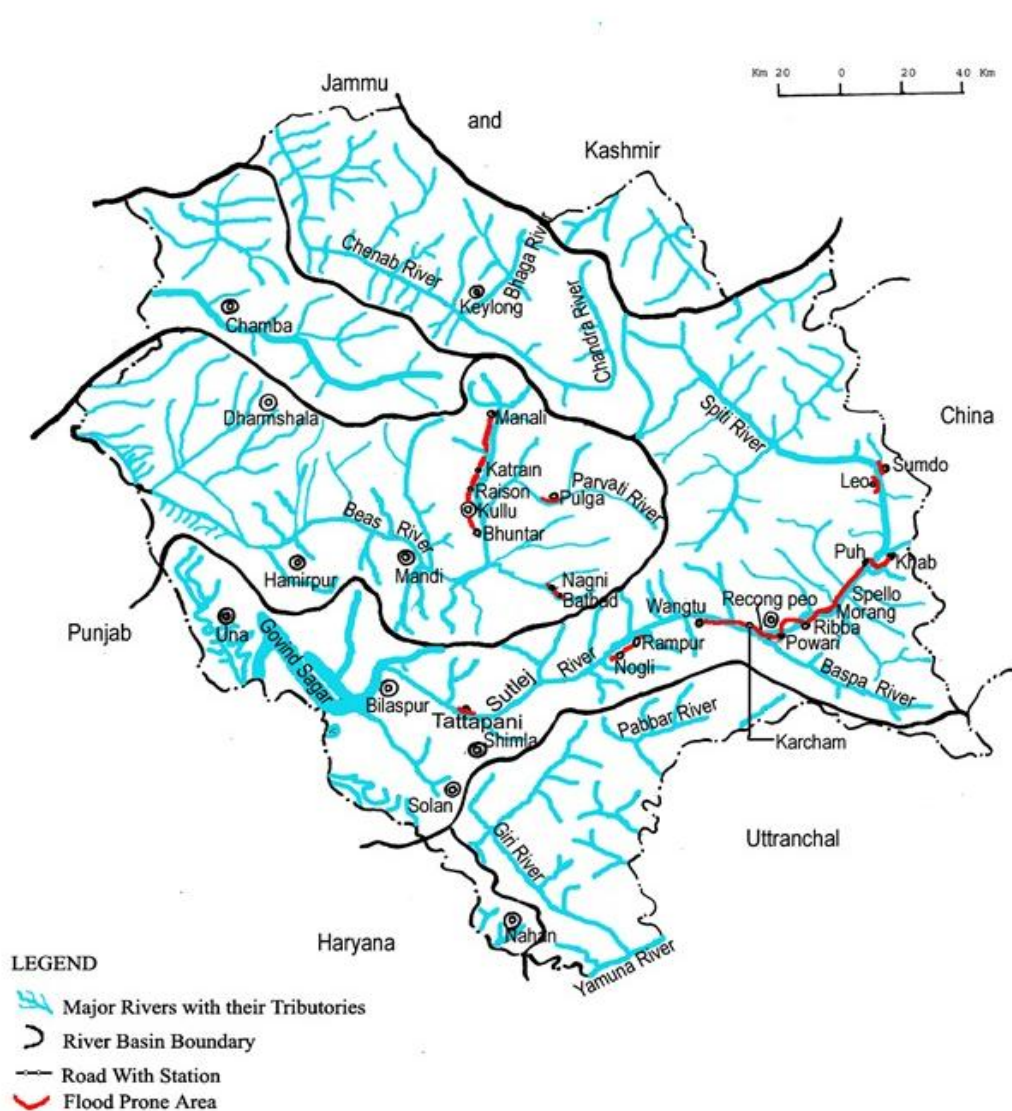


Figure 2.6 Flood prone areas of Himachal Pradesh

2.5.1 Flash Flood

Flash flood is the most frequent and damaging floods that occur with little or no warning causing immense loss to life and property. Flash Floods usually takes place when rapidly rising and flowing surge of water reaching full peak within few minutes is generated as a result of excess rainfall or failure of impoundment.

The major causes that are responsible for floods and flash floods in the state of Himachal Pradesh are

- Cloudburst in upper catchments of the river.
- Excessive rainfall in the catchments.
- Melting and Bursting of glaciers due to global warming.
- Sudden breach or failure of manmade or natural barriers.
- Change of river course.
- Landslides triggered due to slope failure or tectonic movements leading to LDOF phenomena.

Over 40 incidents of flash flood and cloudbursts occurred in Himachal Pradesh in the last 12 years and over 35 were feared dead. In August 1994, the Manimahesh cloudburst and flash flood washed away almost the entire length of Chamba-Bharmour road (62 km), over 50 people feared dead, and 2000 injured. The estimated loss was over 450 crore of Rupees. 1997 again saw a heavy flash flood in Maglad in Rampur tehsil of Shimla district. Some of the major flash floods reported in the State are as follows:

Table 2.13 Major Flash Floods in Himachal Pradesh

Year	Location	Official Damage
July 2000	Satluj River, Kullu, Mandi, Kinnaur, Rampur	140 dead, 400 shifted, 12400 sq km. Affected
August 2001	Chamba	16 dead, 3010 sq km affected
July 2003	Gadsa valley – Kullu	35 dead
August 2004	Satluj river, Kinnaur, Shimla, Kullu, Bilaspur	3500 people and 56 villages evacuated
June 2005	Parchu lake, Kinnaur, Rampur	5 bridges damaged, 50 houses submerged



ELEMENTS AT RISK

Communication infrastructures and other lifeline infrastructure such as roads, bridges, education institutions located in close proximity to HFL are particularly at risk. Precious agriculture and horticulture pockets, forest trees, Biodiversity are invariably damaged and eroded during floods. Hydro power infrastructure of both mega and micro-hydel projects is at a greater risk. The Sutlej river valley is highly flood prone and often neighboring districts like *Kinnaur and Shimla* are worst affected. In these districts, more than 40 percent houses/ buildings made up of light weight sloping roof, and 70% made up of mud and un-burnt bricks are at higher risk.

2.6 Glacial Lake Outburst Floods

Outside the polar region, the Hindu Kush-Himalayas contain the largest area in the world covered by glaciers and permafrost. The Himalayan region is intrinsically linked to global atmospheric circulation, hydrological cycle, bio-diversity and water resources. It has about 15,000 glaciers which is nature's renewable storehouse of fresh water. The region is also the cradle of nine major river systems in Asia whose basins are home to over 1.3 billion people. However, in the face of accelerated global warming the glaciers in the Himalayan region are retreating/ melting at as higher rate of 30-60 meters per decade leading to accumulation of increasing amounts of water in mountain-top lakes.

As glaciers retreat, glacial lakes form behind moraine or ice 'dams'. Due to the inherent instability of such 'dams', the potential of sudden outbursts/ breaches is extremely high. Such outbursts can lead to a discharge of millions of cubic meters of water and debris in a few hours which can cause catastrophic devastation and flooding up to hundreds of kilometres downstream. Such flooding can lead to serious damage to life, property, agriculture, livestock, forests, eco-systems, the livelihoods of mountain communities heavily dependent on mountain eco-systems for sustenance, as well as precious socio-economic infrastructure/assets like hydro-power, electricity, communications, roads and bridges. All of these can induce forced migration and undermine the already meagre sources of livelihood of mountain people and downstream communities.



This phenomenon constituting a sudden discharge of a huge volume of water from such glacial lakes is known as **Glacial Lake Outburst Floods (GLOFs)**. The frequency of such events is increasing in the HKH region since the second half of the 20th century (UNEP, 2003) due to the combined effects of climate change and deforestation. Satellite observation of the mountain top lakes in the region have revealed a steady increase in the size and volume of many of these glacial lakes at high

altitudes, enhancing the possibility of a devastating outburst flood affecting sizeable populations and damaging precious socio-economic infrastructure and development assets in the Himalayan belt.

Over the years, countries in the region have built many high-value economic and infrastructure assets and the emerging threat from GLOFs has serious implications for their future development pathway.

Glacial Lakes in the Himalayas and Vulnerability

The Himalayan region is susceptible to a whole range of hydro-metrological, tectonic and climate-induced disasters. With warming in the Himalayas being higher than the global average (ICIMOD, 2007), climate-induced natural hazards are likely to be exacerbated, including severe glacial melting and the formation of glacial lakes.

Inventory of glaciers and glacial lakes has been and knowledge of GLOFs in the Himalayan region. Is being acquired by the technical and research institutions located in the Himalayan region like ICIMOD, Wadia Institute of Himalayan Geology, UNEP, G.B. Pant Institute of Himalayan Environment and Development, National Environment Commission (Bhutan) etc. . Regular monitoring and tracking of the size of these lakes has revealed that quite a few of them are expanding at an alarming rate due to accelerated glacial retreat and melting due to climate change impacts. In India, data is

available for three states: Himachal Pradesh, Uttarakhand and Sikkim. Studies have identified that in Himachal Pradesh, there are 2,554 glaciers, with 156 glacial lakes, 16 of them are potentially dangerous.



There are quite a few reported events in Himachal Pradesh of GLOF/flash floods/river damming outbursts, the most notable being the Parechu outburst flood in Satluj Valley in 2005 which caused considerable damage to livelihoods, houses, roads, bridges, electricity generation and supply and to hydro-power plants downstream, in spite of timely early warnings and monitoring over a period of time. . The impact of such flash floods is further accentuated by the fact that the

numerous distributaries of the Sutlej flow through narrow fragile valleys and *Khuds*, prone to constant landslides and mud flows.

Past GLOF events in Sutlej Basin

1997: Flash floods washed away six bridges in the Sutlej basin and Kinnaur district was completely cut off.

2000: Flash floods occurred in the Sutlej river basin.

2005: The Parechu river lake in Tibet burst causing loss of life and heavy destruction of livelihoods and infrastructure, particularly in Kinnaur and the eastern part of Shimla districts in Himachal Pradesh.

Kinnaur district has a number of valleys varying in altitude from 1,000 metres to 4,000 metres and among these the Sutlej valley is the largest river valley of the district which traverses for about 140 km.

The inventory in the ICIMOD study on Himachal Pradesh identified two moraine dammed glacial lakes of potentially high threat of outburst in the Sutlej Basin. Community based risk reduction measures in the vicinity and downstream of these glacial lakes is required to be taken up on priority.



Table 2.14 Glacial Lakes in the Sutlej Basin of potentially high threat of outburst

Lake No.	Latitude	Longitude	Area (m ²)	Length (m)	Map code	Orientation	Lake type
Sutlej_gl7	31°45'44.73"N	78°06'44.25"E	27779.21	262.1	53i	S	Moraine dammed
Sutlej_gl10	32°00'37.86"N	78°23'24.62"E	58659.48	384.6	53i	S	Moraine dammed

Source: International Council of Integrated Mountain Development (ICIMOD)

2.7 Avalanches

Snow avalanches are the sudden slide of large mass of snow down a mountain. There are several factors, which can affect the occurrence of avalanche, including local weather, slope, atmospheric temperature, vegetation; terrain and general snow pack conditions. Different combinations of these factors can create low, moderate and extreme weather conditions. Most avalanches are very dangerous and cause huge loss of life and property. The temperature variation and wind speed are directly proportional to avalanches. As per the Snow & Avalanches study established on an average 30 persons are killed every year due to this disaster in the Himalaya.

Areas normally prone to Avalanches include

- Region above 3500m elevation.
- Slopes with inclination 30-45°
- Convex slopes.
- Slopes covered with grasses.

Higher reaches of Himachal Mountains receives considerable precipitation in the form of snowfall. The north western sector particularly receives maximum snowfall. In winter season the snowfall varies from 2 to 130cm in pre monsoon season, from 1-42cm and in post monsoon from 2 to 39cm. Annual amount of snowfall varies from 25 to 204cm and number of snowfall days from 6 to 77. Avalanches are common phenomena in the district of Kinnaur, Chamba & Kullu. In the past the only place where avalanches have caused destruction in Kangra District is the Bara Banghal area situated at an elevation of 8500feet above the sea level. The village which was located at the base of steep slopes and on the banks of Ravi River was destroyed many times by the avalanches in the past.

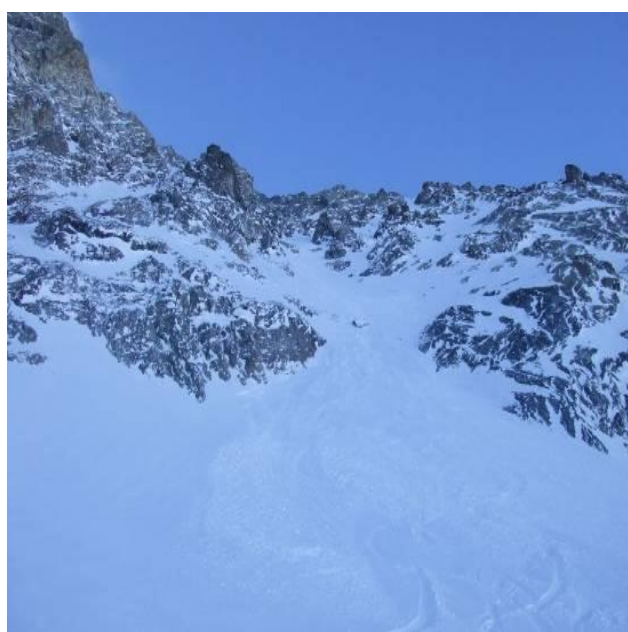


Table 2.15 Damage caused by Avalanches in past

Date	Location	Damage
March 1978	Lahaul and Spiti	30 people killed
March 1979	Lahaul and Spiti	237 people killed
1988	Shimla	Lahaul-Spiti, Kinnaur and Solan districts blocked
March 1991	HP state affected	Road blockage for 40 days
September 1995	HP state affected	Flood caused by melting of snow brought by avalanche
September 2001	HP state affected	Devastated flood caused huge amount of damage

ELEMENTS AT RISK

Roads, bridges, communication lines, hydro power infrastructure, dwellings and humans, Army establishments falling in the way, climbers, expedition camps. Agriculture, Horticulture, Forest land, labor colonies, buildings and trees.

2.8 Forest Fire

Forest fire is a major cause of degradation of forest. With increasing population pressure, the forest cover of the country is deteriorating at an alarming rate. The forests of the Himachal Pradesh are more prone to forest fire compared to forests in other parts of India due to various biotic and geographic reasons. In Himachal Pradesh the recorded forest area is 10, 46900 hectares, of which around 9, 74800 hectares cropped area is fire prone. In Shimla district around 69% of the total area have a history of forest fires and in districts of Chamba, Lahaul Spiti and Kinnaur it is 44.9% of the total area experience forest fires in summer and 20% area is prone to frequent fires.



About 90 % of forest fires are due to intentional or unintentional human interventions. In state like Himachal, forest fires also have a close link with livelihood. People residing within forests or nearby areas are dependent on forests for their source of income and for day to day fuel requirements. At times they ignite forests for collection of forest produce or for improving the productivity. Some fires are caused due to poor knowledge and the negligence of the people. Throwing burning cigarettes and cooking food in the forest are such causes of forest fire. Remaining 10 % of forest fires are due to natural processes such as lightning, increase in temperature during summer etc.

The magnitude of forest fires as disaster can be gauged from the number of fire incidents and area affected as given below:

FOREST FIRE (2008-12)

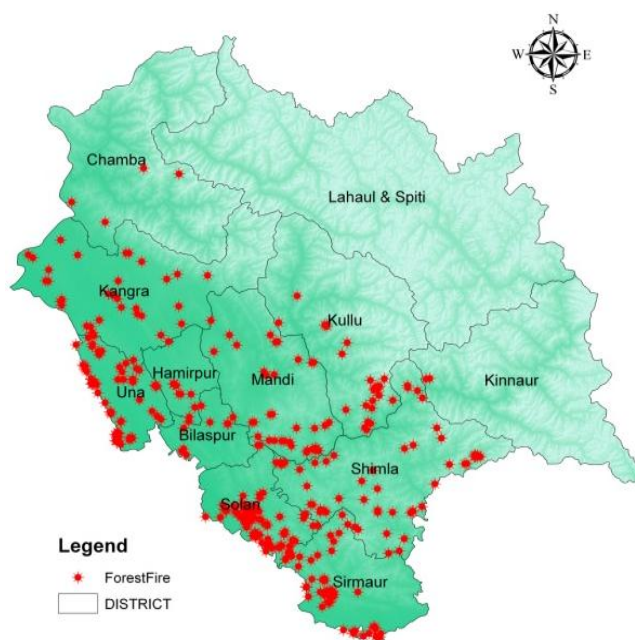


Figure 2.7 Areas affected by Forest Fires (2008-12)

Table 2.16 Forest Fires Affected Area in the State

Year	No of incidences	Areas affected (ha)
1995	1669	57143
2000	1900	36887
2001-02	301	5719
2002-03	282	4204
2003-04	550	9896
2007-08	580	7810

Table 2.17 Forest Fires Affected area during the Last 4 Years

Year	No. of Fire Cases	Kind of Area Affected by Fire (in ha)				%age of Fire Prone Area
		Chil	Plantn.	Others	Total	
2007-08	580	3104	1997	2708	7810	1.80
2008-09	572	2768	2015	1801	6586	1.52
2009-10	1906	13602	4054	7193	24849	5.73
2010-11	870	4308	1446	2082	7837	1.81

Table 2.18 Circle-Wise Fire Lines, Sensitive Beats & Private Ghasanis

Name of the Circle	Fire Lines		No. of Sensitive Beats	Ghasanis near Fire Sensitive Forest	
	No.	Length (Km.)		No.	Area Ha.
Bilaspur	55	175	78	3362	408
Chamba	61	133	83	0	0
D/shala	56	146	171	127	124
H/pur	180	294	171	1616	1809
Kullu	40	93	54	193	533
Mandi	141	518	300	3740	4561
Nahan	61	249	144	168	3040
Rampur	46	121	95	76	477
Shimla	43	142	49	8	140
W/ Life	60	320	100	79	2347
Total =	743	2301	1187	9369	13441

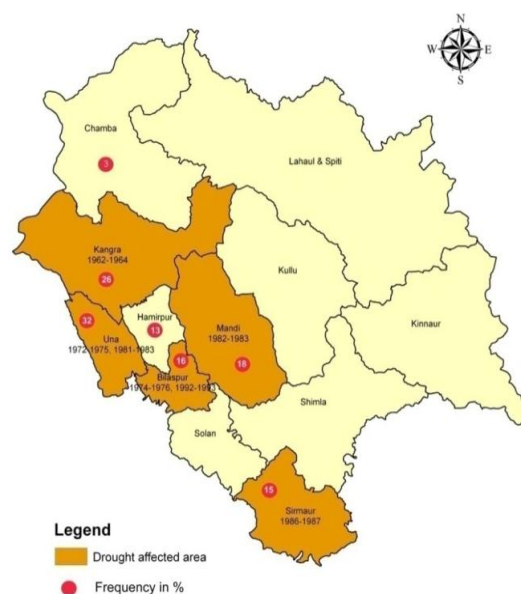
ELEMENTS AT RISK

Forest trees, medical plants, herbs and dwellings around forests, biodiversity, livelihood.

2.9 Drought

Drought is a long period with no or much less rainfall than normal for a given area. Meteorologically drought is defined as situation when the annual rainfall over any area is less than 75% of the normal. It is termed as moderate if rainfall deficit is between 25 to 50 % and severe if it is more than 50%. Area where frequency of drought is above 20% of the years examined is classified as drought area and areas having drought conditions for more than 40% of the years represent chronically drought affected area.

Table 2.19 and 2.20 give the years of successive drought and years of severe drought in the state of HP when rainfall was less than 50%. Taking into consideration the above historical data and above criteria the areas falling in the districts of Kangra and Una between the years 1951-99 could only be termed as drought area. There is not a single district

**Figure 2.8 Areas affected by drought (1951-2000)**

in the state which qualifies to be called as chronologically drought affected area. However during the period Of 49 years (1951-99) almost all the districts have suffered drought like situation Figure 2.8 shows the percentage of drought and years of successive drought for various districts with actual rainfall expressed as percentage of normal rainfall given in brackets against each district. Incident of wide spread drought was observed in the year 1972 and 2011. In the year 2011 in total 46.64 lakh human population and 0.88 lakh ha. cropped area was affected. The water storage capacity in the reservoirs in Himachal Pradesh was 13,774 TMC. Out of this, only 1,188 TMC water was in storage in 2001 as against 1,689 TMC the previous year.

Table 2.19 Years of Successive Drought

Sr. No.	Districts	Years of successive drought
1.	Bilaspur	1974-75-76, 1992-93
2.	Kangra	1962-63-64
3.	Mandi	1982-83
4.	Sirmaur	1986-87
5.	Una	1972-73-74-75,81-82-83

Source: Indian Meteorological Department (IMD)

Table 2.20 Years of Severe Drought

Sr. No.	Districts	Years of Severe Drought R/F < 50%
1.	Bilaspur (37 %)	1975
2.	Hamirpur (45 %)	1974
3.	Mandi (44%)	1983
4.	Sirmaur (48%, 41%)	1979,1986
5.	Una (43%, 40 %)	1975, 1981

Source: Indian Meteorological Department (IMD)

ELEMENTS AT RISK

Agriculture and Horticulture crops, pastures fodder and water sources, fauna, flora and live stock and livelihoods.

2.10 Road Accident

Amongst the man induced disasters the road accidents are major killer. Road accidents involve all kinds of vehicles leading to death and injuries. The topography of the state of HP is such that accidents can happen anywhere without any warning. The table below indicates the magnitude of the problem in the state.

Table 2.21 Year-wise Road Accidents in Himachal Pradesh

Year	Cases Occurred	Persons killed	Persons injured	Vehicles involved
2003-04	2,794	843	4,293	3,195
2004-05	2,758	920	4,674	3,423
2005-06	2,868	861	4,755	2,868
2006-07	2,737	929	4,886	2,917
2007-08	2,953	921	5,272	3,756
2008-09	2,840	898	4,837	3,583
2009-10	3,023	1,173	5,630	3,705
2010-11	3,104	1,105	5,350	3,810

Source: Statistical Outline of Himachal Pradesh 2010-11

Table 2.22 Road Accidents District wise (2011-11)

District	Cases Occurred	Persons killed	Persons injured
Bilaspur	254	42	331
Chamba	122	126	270
Hamirpur	160	28	265
Kangra	602	106	1,076
Kinnaur	51	65	67
Kullu	189	60	368
Lahaul & Spiti	20	15	30
Mandi	370	153	660
Shimla	430	211	801
Sirmour	227	88	324
Solan	407	134	678
Una	272	77	480

The causes for road accidents could be many but statistics shows that 70% of road accidents arise from driver failure. The other plausible factors contributing to disaster are:

- i) Lack of Vehicle Maintenance
- ii) Poor visibility due to Fog or Smog
- iii) Poor or untrained driving
- iv) Lack of emergency services like trauma centers
- v) Absence of stable geological strata leading to sinking of roads
- vi) Night time driving
- vii) Over speeding and Overtaking at curves
- viii) Non-use of horns
- ix) Use of Mobiles and Headphones while driving
- x) Use of alcohol

2.11 Industrial Hazards

The state has concentrated industrial pockets in Solan, Sirmour, Una & Kangra districts which render the area vulnerability to the industrial hazards. As of 2010-2011 the state has about 6069 small, medium and large units operating in the state.

Out of which the units categorized to be falling in red, orange and green categories are 947, 2443, 2652 respectively.

Table 2.23 List of Heavily Polluting Industries

Sr. No.	Description	Small	Medium	Large	Total
1	008 - Aluminum Smelter	4	1	1	<u>6</u>
2	012 - Asbestos and Asbestos Products	0	0	1	<u>1</u>
3	027 - Bulk Drugs and Pharmaceuticals	13	1	3	<u>17</u>
4	CTP - C.E.T.P.	1	0	0	<u>1</u>
5	031 - Cement	12	4	12	<u>28</u>
6	032 - Chemical Fertilizers (Phosphoric, other than Single Super-Phosphate)	1	0	0	<u>1</u>
7	033 - Chemical Fertilizers (Nitrogenous)	1	0	0	<u>1</u>

8	CHE - Chemicals & Products	7	0	0	<u>7</u>
9	040 - Copper Smelter	2	0	0	<u>2</u>
10	045 – Distilleries	1	2	3	<u>6</u>
12	049 – Electroplating	22	4	1	<u>27</u>
13	053 - Exploration for Gas, its Production, Transportation and Storage	1	0	0	<u>1</u>
14	054 - Exploration for Oil their Production, Transportation and Storage	0	0	1	<u>1</u>
15	055 - Ferro Alloys	3	0	2	<u>5</u>
16	FOU - Foundry Plants	2	0	0	<u>2</u>
17	058 - Foundries(Individual)	2	2	1	<u>5</u>
18	FPF - Foundry-Pit Furnace	0	1	0	<u>1</u>
19	061 - Glass and Fiber Glass Production and Processing	4	2	0	<u>6</u>
20	067 - Highway Projects	6	0	3	<u>9</u>
21	069 - Hospitals, Clinics and Diagnostic Laboratories	2	0	1	<u>3</u>
22	074 - Incineration Plants	1	0	0	<u>1</u>
23	075 - Inorganic Chemical Industries (Basic Manufacturing)	5	0	0	<u>5</u>
24	077 - Integrated Iron and Steel Plants	14	5	1	<u>20</u>
25	079 - Integrated Paint Complexes	1	0	0	<u>1</u>
26	080 - Integrated Textile Processing Mills	3	0	0	<u>3</u>
27	085 - Lead Smelter	6	0	1	<u>7</u>
28	088 - Lime Kilns	5	1	0	<u>6</u>
29	091 - Lubricating Oils, Greases or Petroleum-Based Product	4	0	0	<u>4</u>
30	094 - Manufacture of Basic Raw Materials required in the manufacture of Paints	2	0	0	<u>2</u>
31	101 - Metal Finishing Industries	40	4	4	<u>48</u>
32	107 - Mining Projects (Major Minerals) with leases more than 5 Hectares	5	4	2	<u>11</u>
33	XXR - Misc / Others (Red)	135	26	41	<u>202</u>
34	111 – Newsprint	1	0	0	<u>1</u>
35	115 - Organic Chemical Industries (Basic Manufacturing)	1	0	0	<u>1</u>
36	121 - Pesticides	11	0	0	<u>11</u>
37	122 - Petro-Chemical Intermediate SDMT, Caprolactam	1	0	0	<u>1</u>
38	138 - Pulp, Paper (Based on Agriculture Residue and Wood)	2	1	1	<u>4</u>
39	146 - River Valley Projects including Hydel Power	77	25	88	<u>190</u>
40	155 - Slaughter Houses and Composite Meat Plants	2	0	0	<u>2</u>
41	164 - Stone Crushers	308	2	2	<u>312</u>
42	171 - Tarred Roads in Himalayas and/or Forest Areas	1	0	0	<u>1</u>

43	Tex – Textiles	2	0	7	<u>9</u>
44	192 - Zinc Smelter	2	0	0	<u>2</u>

Source: H.P. State Pollution Control Board (HPPCB)

Table 2.24 List of Moderately Polluting Industries

Sr. No.	Description	Small	Medium	Large	Total
1	001 - ACSR Conductor Insulation	9	1	0	<u>10</u>
2	002 - Activated Carbon	1	0	0	<u>1</u>
3	005 - All Hotels above 20 Rooms With Investment Below Rs. 5 Cr.	195	16	7	<u>218</u>
4	015 - Automobile Servicing and Repair Station	71	0	1	<u>72</u>
5	016 - Ayurvedic Medicines Formulation	57	4	3	<u>64</u>
6	017 - Bakelite Switches	2	0	0	<u>2</u>
7	025 – Breweries	0	2	0	<u>2</u>
8	026 - Brick Kiln	131	0	0	<u>131</u>
9	035 - Cleaning Powder (Formulation Only)	2	0	0	<u>2</u>
10	041 - Cotton Spinning & Weaving	6	1	6	<u>13</u>
11	051 - Engineering Industries other than Metal Finishing	116	11	14	<u>141</u>
12	057 - Formulation of Drugs and Pharmaceuticals	364	41	44	<u>449</u>
13	059 - Fragrance, Flavors and Food Additives, Industrial Perfumes (Formulation Only)	25	1	0	<u>26</u>
14	060 - Fruit and Vegetable Processing in Medium and Large Scale	19	4	1	<u>24</u>
15	073 - IMFL (Blending and Bottling Only)	4	0	0	<u>4</u>
16	078 - Integrated Milk Plants	2	0	0	<u>2</u>
17	082 - Katha and other Forest and Agriculture Produce Based	56	0	0	<u>56</u>
18	083 - Laboratory Ware	1	0	0	<u>1</u>
19	084 - Laundry Services and Dry Cleaning	2	0	0	<u>2</u>
20	092 - Maize/Corn Starch	1	0	1	<u>2</u>
21	097 - Manufacturing of Agricultural Implements	5	0	0	<u>5</u>
22	100 - Melamine Wares	1	0	0	<u>1</u>
23	104 - Mineralized Water and Soft Drinks Bottling Plants	27	4	1	<u>32</u>
24	106 - Mining Below 5 Hectares	30	1	0	<u>31</u>
25	XXO - Misc / Others (Orange)	683	68	32	<u>783</u>
26	116 - Oxygen, Acetylene and Other Industrial Gases	7	0	0	<u>7</u>
27	118 - Paint Formulation	2	0	0	<u>2</u>
28	128 - Plastic Industry (PVC, HDPE, LDPE, Bags, Tubes and Pipes)	115	6	2	<u>123</u>

29	134 - Printed Circuit Board (Excluding Electro Plating)	5	0	0	<u>5</u>
30	137 - Pulp and Paper (Based on Waste Paper)	5	2	6	<u>13</u>
31	141 - Reclamation of Used Oil	1	0	0	<u>1</u>
32	145 - Rice Hullors/Shellers	7	0	0	<u>7</u>
33	147 - Roller Flour Mills	20	0	0	<u>20</u>
34	148 - Rubber and PVC Shoe Manufacturing	21	2	0	<u>23</u>
35	152 - Shampoos (Herbal)	5	0	0	<u>5</u>
36	158 - Soap and Detergent Basic Manufacturing	47	6	10	<u>63</u>
37	162 - Steel Furniture, Fasteners etc.	4	0	0	<u>4</u>
38	172 - Tea Manufacturing	4	1	0	<u>5</u>
39	182 - Tyre Re-Treading	86	0	1	<u>87</u>
40	183 - Vegetable Oils	5	0	0	<u>5</u>
41	185 - Washing of Equipment and Regular Floor Washing, Using Cons Cooling Water	2	0	0	<u>2</u>
42	186 - Washing of Fabrics (Job Work)	1	0	0	<u>1</u>
43	187 - Welding Units	6	0	0	<u>6</u>

Source: H.P. State Pollution Control Board (HPPCB)

Table 2.25 List of Low Polluting Industries

Sr. No.	Description	Small	Medium	Large	Total
1	003 - Air Cooler/Conditioners Assembling	3	3	3	<u>9</u>
2	006 - All Hotels Upto 20 Double Rooms with Investment less than Rs. 5 Cr.	740	4	2	<u>746</u>
3	013 - Atta Chakki	10	0	0	<u>10</u>
4	018 - Bakeries	12	0	2	<u>14</u>
5	020 - Batten Wooden Boards Mfg.	1	0	0	<u>1</u>
6	021 - Battery Charging	7	1	0	<u>8</u>
7	BRI - Bricks	1	0	0	<u>1</u>
8	030 - Card Board & Paper Products (Pulp & Paper Mfg. Excluded)	32	0	1	<u>33</u>
9	036 - Cold Storage	11	0	0	<u>11</u>
10	037 - Computer Assembling Only	10	1	0	<u>11</u>
11	039 - Confectionery	3	0	5	<u>8</u>
12	042 - Dairy Farm (Small Scale)	2	0	0	<u>2</u>
13	048 - Electrical Heating Appliances (Assembly)	34	1	3	<u>38</u>
14	050 - Engine Coolant	2	0	0	<u>2</u>
15	056 - Fluorescent Tubes and Bulbs	7	1	0	<u>8</u>
16	062 - Gold and Silver Smithy	2	0	0	<u>2</u>
17	066 - Herbal Oil Extraction (Without Solvent)	17	0	0	<u>17</u>
18	068 - Hollow Block Making	9	0	0	<u>9</u>

19	072 - Ice Cream and Ice Cream Cone Mfg.	1	0	1	<u>2</u>
20	086 - Leather Adhesive (Formulation)	1	0	0	<u>1</u>
21	087 - Light Engineering Industry including Fabrication	79	3	1	<u>83</u>
22	093 - Making Crumbs Powder from Waste Rubber	2	0	0	<u>2</u>
23	095 - Manufacture of Mirror from Sheet Glass & Photo-Framing	2	0	0	<u>2</u>
24	096 - Manufacture of Resins in large and Medium Sectors	1	0	0	<u>1</u>
25	099 - Manufacturing of Steel and Aluminum Utensils, Trunks	6	0	0	<u>6</u>
26	103 - Milk Chilling Centres	1	1	0	<u>2</u>
27	105 - Miniature Circuit Breakers (Assembly)	1	0	1	<u>2</u>
28	XXG - Misc / Others (Green)	1131	61	52	<u>1244</u>
29	108 - Mushrooms (Growing)	8	0	0	<u>8</u>
30	109 – Namkeens	12	0	0	<u>12</u>
31	113 - Oil Expellers (Without Solvent Extraction)	5	0	0	<u>5</u>
32	117 - P.C.C. / R.C.C. Poles.	6	0	0	<u>6</u>
33	125 - Photo Emulsion Coating	2	0	0	<u>2</u>
35	126 - Pickle Manufacturing	7	0	0	<u>7</u>
36	130 - Plastic Jerry Cans	4	0	0	<u>4</u>
37	131 - Plastic Water Tanks	18	0	0	<u>18</u>
38	132 - Potato Wafers	1	0	0	<u>1</u>
39	133 - Poultry Feed and Animal Feed	9	0	0	<u>9</u>
40	136 - Printing Process (Textiles Excluded)	23	3	0	<u>26</u>
41	142 - Residential Educational Institutes With Boarding Capability Upto 200 Nos	13	1	3	<u>17</u>
42	143 – Restaurants	18	0	0	<u>18</u>
43	149 - Saw Mills	1	0	0	<u>1</u>
44	150 - Seasonal Katha Bhatties	10	0	0	<u>10</u>
45	153 - Shoelace Manufacturing	1	1	0	<u>2</u>
46	157 - Small Poultry Farms	1	0	0	<u>1</u>
47	160 - Sports Goods	3	0	0	<u>3</u>
48	161 - Spun Pipes	3	0	0	<u>3</u>
49	167 - Supari and Masala Grinding	1	0	0	<u>1</u>
50	168 - Surgical Cotton & Bandage	2	0	0	<u>2</u>
51	173 - Teflon Coated Electric Cable	0	0	1	<u>1</u>
52	175 – Thermocol	3	0	0	<u>3</u>
53	177 - Tiles Making (Cutting & Polishing of Marble/Granite)	7	0	0	<u>7</u>
54	179 - Toothpaste and Powder	1	0	1	<u>2</u>
55	180 - Trimming, Cutting, Juicing & Blanching of Fruits and Vegetables in Small Scale	13	0	0	<u>13</u>
56	181 - Turning/ Machining	14	0	0	<u>14</u>

57	188 - Wire Drawing (Without Galvanizing & Pickling)	29	1	0	<u>30</u>
58	189 - Wire Rope Making (Dry Processes Only)	3	0	0	<u>3</u>
59	190 - Wires, Pipes Extruded Shapes from Metals (Excluding Pickling, Galvanizing)	6	0	2	<u>8</u>

Source: H.P. State Pollution Control Board (HPPCB)

NOTE: The number of industrial accidents that took place in the last three years is indicative of vulnerability threat and risk that exists to life and property in the industrial belts.

Table 2.26 Industrial Accidents in Himachal Pradesh (2008-2010)

Year	No. of fatal accidents	No. of persons died in fatal accidents	No. of non fatal accidents	No. of persons injured in non fatal accidents	Total no. of Accidents	Total no. of persons died & injured
2008	6	6	5	5	11	11
2009	10	19	9	32	19	51
2010	3	11	3	5	6	16

Source: Directorate of Labour and Employment, Govt. of Himachal Pradesh

2.12 Temple Stampedes

The State of Himachal has large number of Hindu temples as pilgrimage centres. According to some estimates there are more than 2000 temples in the State. Some of the temples in the State like Jawala Mukhi & Baijnath in Kangra, Chintpurni in Una, Bijli Mahadev in Kullu, Tarna in Mandi, Renukaji in Sirmour, Laxmi Narayan in Chamba, Bhima Kali in Sarahan Shimla attract large number of visitors and tourists every year. Stampedes are common during religious gatherings. Himachal Pradesh being a land of God's the people observe large number of festivals when mass gathering forms dense moving crowd.

On August 3, 2008 the Naina Devi temple experienced worst ever tragedy when 146 devotees, including 30 children and 38 women were crushed to death and 50 injured in Stampede triggered by a rumour of landslide. The tragedy took place in the holy month of Sawan and as per media reports there were about 3000 devotees present at the time of catastrophe. Rumours of landslide and rolling down of boulders from a nearby hill top spread fear among the devotees who had gathered in large number in the shrine to offer prayers during Navaratra festival. As a result of the rumour the Stampede occurred and the people died when they were crushed, trapped and forced over the side of nearby Nallah by the movement of a large panicking crowd. The primary factor leading to a stampede is pressure which is multiple of speed variance and density. In order to stop or prevent such mishaps in future the following measures are proposed to be taken:

- i) Ensure that the available infrastructure such as roads, corridors, entrances and exits are adequate for the gathering expected to assemble at religious places and there are no bottlenecks and compression points.
- ii) Every temple where large gathering is expected will have a crowd management plan.
- iii) Contingency plans for evacuation will be developed on priority.

2.13 Air Crash

Public air traffic in the State is limited to three sectors mainly along

- Delhi – Gagal in Kangra
- Delhi – Kullu and
- Delhi – Shimla

There are large number of helicopters both private & Army that fly over the State regularly. The only air crash involving civilian tragedy was that of the then Hon'ble Governor of Punjab & Himachal Late Shri Surender Nath and nine members of his family. On July 9 1994 Government's Super King Aircraft crashed in the hills near Kamrunag in Mandi district. The bad weather on the day of accident has been identified as a factor responsible for the tragedy. Similarly crashing of Army and Air Force helicopters in the higher ranges of the State is a common phenomenon.

2.14 Man and Animal Conflict

Though the damages & loss caused by wild animals is not yet included in the list of disasters identified in the relief manual yet the issue has now become very serious for the last couple of years. During public consultation the farmers identified the wild animal and monkeys as the dominant threat for their livelihood. The attacks of wild animals and monkeys are considered to be much more damaging as it happens regularly without any warning. The data for the period from 2009-2012 suggest that the wild animals attack on human and animals were as high as 2789 in which 21 people even lost their lives. The compensation and relief worth Rs. 145, 33,031 during the same period was also provided to the affected families. Minimising or preventing damage to crops by resolving man and animal conflict is emerging a major challenge. According to media reports there are about 3.5 lack monkeys in the state affecting the farming community in about 2600 Panchayats. Annually damage to the crops has been estimated to the tune of Rs 500 crores. In order to tackle the menace the Govt. has planned to spend Rs 10 crores during the budget year 2011-2012.

2.15 Vulnerability

The state of Himachal Pradesh being prone to multiple geophysical and man induced hazards, its people are highly vulnerable to vagaries of nature. Some of the peculiarities of the state that render the hill communities vulnerable and risk prone are:

- Physical isolation & tough terrain.
- Scattered nature of settlements & hamlets.
- Harsh climatic conditions.
- High construction cost.
- Inadequate infrastructure.
- Inadequate road connectivity
- Fragility of eco-system.
- Non availability of adequate land.
- Poor or inadequate communication infrastructure.
- Dependency of 70% people on agriculture and allied sectors for their livelihood.
- 90% of the population is rural in character.
- Heavy dependence on rains and inadequate irrigation.
- Substantial population of livestock (52, 26,388).
- Vulnerability to climate change.

The past experiences suggest that the vulnerabilities and associated risks in the state gets further complex due to the following reasons.

2.15.1 Accessibility

Immediate impact of disasters such as floods, landslides or earthquake is the disruption in the road connectivity. Sometimes the roads in the valley areas remain cut-off for months due to the occurrence of landslides, formation of lakes and submergence of roads. There are many instances when the districts of Kinnaur and Lahaul & Spiti remained cut-off from rest of the state for months.

At times the connectivity is also broken due to avalanches and snowstorms hindering the transport to the affected areas and especially to the border areas. Lack of connectivity would also cause secondary effects such as non availability of essential supplies, hoarding by the rich and hardship to the poor.

2.15.2 Dispersed Settlements

The dispersed and scattered nature of the settlements away from the roads on top of spur, hills and deep in the valleys also render the communities highly vulnerable in the wake of disasters. For instance in the absence of road connectivity the fire tender could not reach village **Chachawari in Rohru area of Shimla district** which was devastated by the fire on _Dec 23, 2011. As a result about 65 houses were reduced to ash, 250 cattle perished and 450 people were affected including the aged and children. As per the 2011 Census the State has about 20,000 villages scattered in different districts of the state. As on day only about 8,000 villages have been connected by roads. One of the sample surveys in the state indicates that the average distance of unconnected villages from the nearest motor able road is 5.17 Km in the high hill areas, 2.06 Km in the low hills and 1.41 Km in the plain and valley areas. Poor connectivity is attributed to high hill costs of cutting roads through steep slopes and hard rocks and relatively longer gestation of road projects Apart from road connectivity the disrupted telecommunication and electricity supplies will further enhance the vulnerability of communities

2.15.3 Harsh Climate

The harsh climate especially the winter season can disrupt the response, preparedness and rehabilitation operations in case the disaster happens to be during such period. Isolation of affected communities and villages due to hostile weather condition render them vulnerable to hardships of all kinds besides the risk of increased death toll due to snowfall, rains, freezing temperature and non availability of required relief. In fact, during 1975 Kinnaur earthquake, not many people died due to earthquake, but due to heavy snowfall, providing relief became difficult and the affected people had to suffer in the absence of health services to injured, shortage of food, shortage of warm clothing and shelter. Due to poor visibility and inclement weather even reaching to the affected villages by helicopter was not possible.

2.15.4 Seismic Vulnerability & Risk

Worldwide it is seen that out of hundred most deadly and hundred most expensive natural disaster of the 20th century, 25 and 15 events respectively were due to earthquakes (EM_Dat 2006). The seismic record for the past years coupled with continued occurrence of moderate to large earthquakes in the state of Himachal Pradesh render the state's seismic vulnerability very high. Even though the earthquakes are generally considered to be rare low probability events with recurrence periods of the order of several decades, yet they pose extremely high risk.

The factors responsible for high seismic Vulnerability and risk are as follows:

- 32% of the total geographical area of the state falls in **very high** damaging risk and remaining 68% in **high damaging risk zone**.
- High seismicity zones are also the areas of heavy concentration of population. Sample GIS based assessment suggest that **very high vulnerable zone accommodates about 60%** of the total population of the state followed **by 38 in high vulnerable zone and only 3% population in low vulnerable** comprising areas of Kinnaur & Lahaul Spiti districts. Another assessment made using the population potential for **109 tehsils and sub tehsil** headquarters of the state suggest two highly vulnerable zones viz. **Kullu-Mandi-Sundernagar Corridor and Palampur-Dharamshala-Kangra-Dehra Corridor. Areas surrounding Chamba, Nurpur, Hamirpur and Bilaspur have also been identified as highly vulnerable zones by this assessment.**

- Even though the intensity of past seismicity is more in districts of Chamba (33.63), Lahaul & Spiti (17.91), Kinnaur (16.82) and less in Kangra (7.05), Kullu (3.44), Hamirpur (0.36) yet the building topology coupled with density of population render the latter areas more risk prone than the former.
- The house types mostly fall under Category A consisting of walls of clay mud, unburnt brick or random rubble masonry without any earthquake resisting features. The districts liable to the severest design intensity of MSK IX or more, also account for very high percentage of category A houses. Even category B houses as built in the state do not have the earthquake resisting features and are liable to severest damage under intensity IX and VIII earthquake.
- Risk from impending earthquake can be gauged from the simulation scenario projected by Prof. Arya by taking into consideration the damage & loss caused by earthquake of 1905. Kangra earthquake having a Richter Scale magnitude of 8 caused 20,000 human deaths, destruction of around one lakh houses and around 53000 animals and the earthquake was felt in an area around 41,600 Sq.Km. Hypothetical recurrence of earthquake of magnitude 8 in the same area as in 1905 highlights the scenario by taking into consideration the Census data of 1991. The study projects that if all the 18,15,858 houses (1991) are without earthquake safety provisions the direct loss will amount Rs. 51.04 billion, 65,000 lives may be lost and about 399,695 houses will be ruined completely. The trauma will be too great and cost of emergency relief will be exorbitant.
- With reference to the census year 1991 population in the state have grown by 32% by the census year 2011. Seismic risk from physical, social and economic perspective can be appreciated from the above scenario.

**Distribution of houses by predominant materials of Roof and Wall and
Level of Damage Risk in Himachal Pradesh**

Wall/ Roof		Census House		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55&60	47	44&39	33		
				Area in %				Area in %					
State – HIMACHAL PRADESH 02				44.2	55.8					0.1	8.7	91.2	
WALL													
A1 – Mud & Unburnt Brick Wall	Rural	640,847	26.6										
	Urban	20,946	0.9										
	Total	661,793	27.5	VH	H				VH	H	M		
A2 – Stone Wall	Rural	982,235	40.8										
	Urban	30,368	1.3										
	Total	1,012,603	42.1	VH	H				H	M	L		
Total – Category A 1,674,396			69.5										
B – Burnt Bricks Wall	Rural	455,886	18.9										
	Urban	168,730	7.0	H	M				H	M	L		
	Total	624,616	25.9										
Total – Category B 624,616			25.9										
C1 – Concret e Wall	Rural	10,230	0.4										
	Urban	8,193	0.3										
	Total	18,423	0.7	M	L				L	VL	VL		

C2 – Wood wall	Rural	43,416	1.8									
	Urban	5,218	0.2									
	Total	48,634	2.0	M	L			VH	H	M		
Total – Category C			2.8									
X – Other Materials	Rural	35,725	1.5									
	Urban	7,128	0.3									
	Total	42,853	1.8	M	VL			VH	H	M		
Total – Category X			1.8									
TOTAL BUILDINGS												
2,408,922												
ROOF												
R1 - Light Weight Sloping Roof	Rural	534,297	22.2									
	Urban	64,512	2.7									
	Total	598,809	24.9	M	M			VH	VH	H		
R2 – Heavy Weight Sloping Roof	Rural	1,076,451	44.7									
	Urban	22,355	0.9									
	Total	1,098,806	45.6	H	M			H	M	L		
R3 – Flat Roof	Rural	557,591	23.1									
	Urban	153,716	6.4									
	Total	711,307	29.5	Damage Risk as per that for the Wall supporting it								
TOTAL BUILDINGS												
2,408,922												

Housing Category : Wall Types

Category-A : Buildings In field-stone, rural structures, Unburnt brick houses, clay houses.

Category-B : Ordinary brick building: building of the large block & prefabricated type, half-timbered structures, building in natural hewn stone.

Category-C : Reinforced building, well built wooden structures

Category-X : Other Materials not covered in A.B.C. These are generally light

Notes: 1. Flood prone area includes area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and checked drainage.

2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A,B and C(Reinforced Concrete) building

3. Source of Housing Data: Census of Housing. GOI, 2001

Housing Category : Roof Type

Category-R1 – Light Wight(Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)

Category-R2- Heavy Weight(Tiles, Slate)

Category-R3- Flat Roof(Brick, Stone, Concrete)

EQ Zone V : Very High Damage Risk

Zone(MSK>IX)

EQ Zone IV :High Damage Risk Zone(MSK VIII)

EQ Zone III :Moderate Damage Risk Zone(MSK VII)

EQ Zone II :Low Damage Risk Zone(MSK<VI)

Level of Risk: VH= Very High; H=High;

M=Moderate; L=Low; VL=Very Low

Damage Scenario in the event of hypothetical Earthquake in Kangra

An earthquake scenario has been worked out by Prof A. S. Arya which eloquently explains the likely damage scenario that will emerge if 1905 earthquake is repeated. The Kangra Earthquake was a giant earthquake of M=8.0 which occurred close to Dharamshala town at 6:20 hours in the morning which left 20000 dead. The intensity distribution and the impact felt was as follows-

MM X: 500 SQ KM area affected, buildings completely destroyed.

MM IX: Area affected 2400 Km², most rural buildings completely and most urban buildings partially destroyed.

MM VIII: Area affected 5000 Km², most rural buildings partially destroyed and many urban types widely cracked.

Roads: Got broken in MM X area access to damaged area rendered difficult.

Deaths: Half of civil and military personnel in Dharamshala cantonment died. Practically all subordinate government staff living in Kangra town killed. More people actually died than injured.

The scenario given in the table below highlights the damages that may take place in a magnitude 8.0 hypothetical earthquake if occurred again in Kangra, Himachal Pradesh by taking into consideration the Building Census of 1991 (total housing units in the affected area - 1,815,858).

Sr. No.	Item	Scenario if all the buildings are without earthquake resistance		Scenario of all buildings are with earthquake resistance	
		Physical Damage	Loss in INR* (million)	Physical Damage	Loss in INR* (million)
1.	Loss of lives	65,000	6,500	12,000	1,200
2.	Total collapses of buildings (G5)	1,36,339	9,540	8,298	580
3.	Destroyed buildings (G4) 2+3 Buildings to rebuild	2,63,356	18,430	94,997	6,650
		3,99,695	27,970	1,03,295	7,230
4.	Heavily damaged buildings (G3; to repair and retrofit)	9,15,602	12,820	3,12,382	4,370
5.	Moderately damaged buildings (G2; to repair and retrofit)	3,57,510	3,750	6,48,040	6,800
6.	Total Loss		51,040		19,600

*INR-Indian rupees, 1US\$INR 40.0 in 1997; G5, G4, G3, G2 are grades of damage defined in MSK Intensity scale. Losses estimated in 1997 at 1997 costs.

The damage and loss scenario could be more disastrous now as the population of the State and built-up environment has increased many times since 1991. Present estimate of devastation in a repeat hypothetical earthquake is that (a) loss of more than 340,000 lives will occur if the earthquake will happen at midnight of winter months and half of this number if it will occur in the morning when people are awake and sleeping, (b) the urban facilities particularly hospitals, schools, communication buildings, transportation routes in the hilly region and water supply facilities will be badly damaged. The fragility of the present situation was amply demonstrated by the rather small earthquake of M=5.7 occurring on April 26, 1986 causing economic loss of about Rs. 66.00 crore.

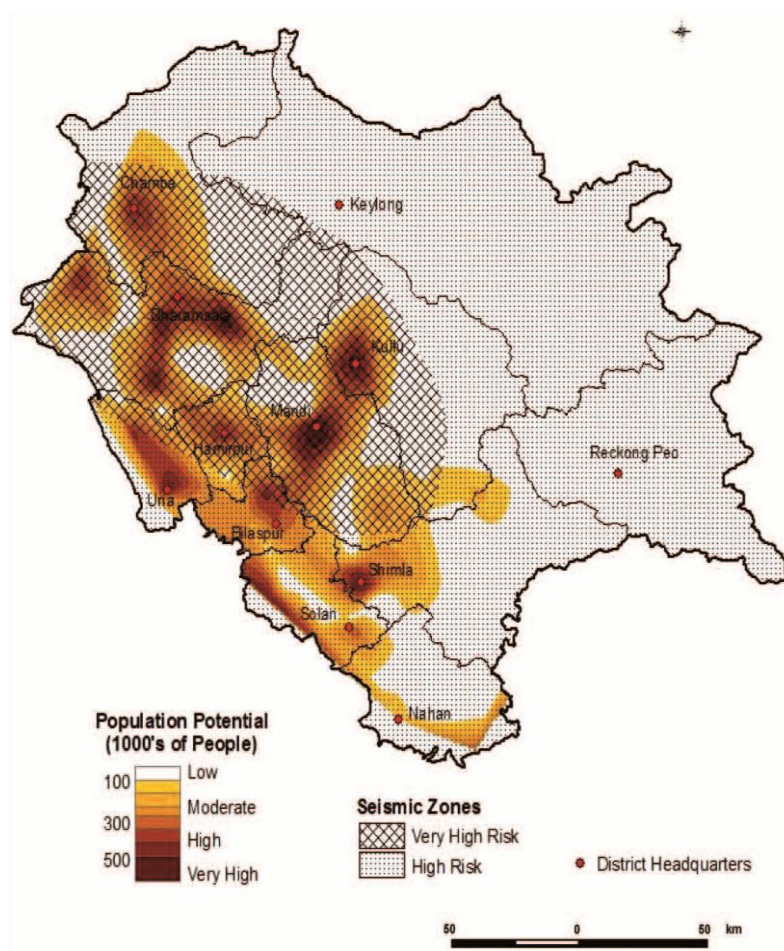


Figure 2.9 Population potential and Seismic Risk Zones in Himachal Pradesh

Source: Source: Vishwa, B. S. Chandel & Karanjot Kaur Brar

2.15.5 Vulnerability to floods & Flash floods

Floods on account of high precipitation or cloud bursts cause inundation where carrying capacity of the streams is exceeded. Floods not only causes huge economic loss in the form of damage to houses, roads, bridges, power projects, public utilities but also cause immense loss of human and live stock. The topography and geometry of channels in the state is such that inundation takes place only in stretches and widespread flood problem does not exist in the state

The flash floods and cloud bursts has caused enormous loss of life and property in past. The risk has also grown many times as large number of power projects and drinking water supply infrastructure in the state are situated in the major river basins. During the floods of 2000 the economic loss was to the tune of more than Rs. 1,000 crores and 150 peoples were killed. Every year the relief is distributed to compensate for the losses incurred due to floods of various kinds.

Table 2.27 Flood Damage during 2001-2011

Sr. No.	Year	Area affected in (m. ha.)	Population affected in (million)	Damage to crops		Damage to houses		Cattle lost nos.	Human lives lost nos.	Damage to public utilities (Rs. Crore)	Total damage crops, houses & public utilities (Rs. Crores)
				Area (m. ha.)	Value (Rs. Crore)	Nos.	Value (Rs. Crore)				
1	2000	0.420	0.876	0.031	46.828	3863	13.087	1411	35	1466.028	1525.941
2	2001	0.0008	0.405	0.006	20.050	2683	4.223	915	45	113.981	138.254

3	2002	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
4	2003	0.033	0.303	0.016	17.790	2924	60.068	452	89	87.964	165.822
5	2004	Neg.	0.022	Neg.	0.673	525	0.864	103	8	29.236	30.772
6	2005	0.530	0.873	0.048	328.590	2024	9.147	3049	8	222.063	569.800
7	2006			0.094	245.490	4379	23.665	846	48	351.568	620.723
8	2007			0.180	239.159	10820	96.440	3087	98	933.349	1268.948
9	2008			0.093	325.470	11686	138.010	2780	145	440.162	911.642
10	2009	0.000	0.000	0.000	0.000	0	0.000	0	0	0.000	0.000
11	2010	0.001	0.608	0.204	286.340	6666	7.978	5839	62	1750.710	2044.028
12	2011	0.030	0.608	0.157	417.390	8467	0.480	2372	51	618.600	1036.470

2.15.6 Vulnerability to Cloud bursts

Cloud bursts are devastating weather phenomenon representing highly concentrated rainfall over a small area for a short time usually 100 mm of rainfall per hour is reported during such situation. The secondary consequence of cloud bursts is the occurrence of landslides and flash floods causing destruction of houses, dislocation of traffic and human miseries on a large scale. Exact mechanism responsible for cloud bursts is not yet understood. Cloud bursts are generally associated with thunderstorms clouds. The air currents rushing upwards in the clouds hold up a large amount of water. The geography configuration of Himachal valleys provides conducive situation for the vertical lifting necessary for the formation of cumulonimbus clouds of those upward currents suddenly cease the entire amount of water descends on to a small area with catastrophic force all of a sudden resulting in devastation.

The state experience cloud bursts during southwest monsoon period and the frequency is more during the months of July & August. Most vulnerable and sensitive areas are:

- Parts of districts Kullu, Shimla, Kinnaur and Mandi.
- Stretch from Bhuntar to Manikaran (Bank of river Parvati) and Kullu to Manali (Banks of river Beas). In the above belts at least one or more cloud burst is reported every year.
- Parts of districts Kangra, Chamba, Sirmaur, Solan and Hamirpur constitute areas with moderate to low vulnerability.

Table 2.28 List of devastating Floods in Himachal Pradesh

Sr. No.	Prominent Flash Flood	History of Damage Occurred
1	8 July 1973	Lake formed by the blockage of Satluj river due to Nathpa rock fall damaged Sanjay power house, loss of about Rs. 45 million estimated.
2	In Satluj basin two blockage were observed in Spiti valley, One on Parechu River between Sumdo and Kaurik due to landslide created by 19 th Jan 1975 earthquake, which occurred along the Sumdo-Kaurik fault. Blockage was 60m in height and 150m in length created temporary lake, In march this lake burst causing flash floods in Spiti valley.	

3	On 29 th Sept. 1988(2.30 a.m) a flash flood occurred due to cloud burst in Soldang khad causing huge damage to property.	Caused heavy loss of life and property in the Soldang village Washed away the Bhabanagar water works. Washed away 2 Km of NH-22 across Soldan Khad Created Landslides along the eastern slopes of soldan Khad and damaged road to Ponda Lake was formed on the Satluj river near confluence Blockage stopped the flow of Satluj river for about 30 minutes and created a temporary lake about 6000m long and 250m wide and 25-30m deep extending up to wangtoo bridge Lake water entered Sanjay Vidyut Pariyojna and damaged the Power House.
4	31 st July and 2 August 1991 24 th Feb 1993 Satluj river blocked twice due to mJOR landslide and rock fall near Jhakri and Nathpa damaging NH22 Another flash flood occurred in two phases along Duling khad on 4 th and 5 th September causing extensive damage in Tapri, district Kinnaur	Cloudburst and flash flood along Soldan Khad in Satluj valley killed 32 people, 15 houses, 35 bigah of agriculture land, 600 apple trees, 2Km of road of NH22 and 20m bridge on Soldan khad washed away
5	First flash flood occurred on 4 th September 1995 at 2 PM. After cloudbursts in the upper catchment of Duling and damaged the PWD rest house Another flood came at 6AM and 9AM on 5 th Sept, 1995 bursting the lake formed during the previous cloudbursts	<ul style="list-style-type: none"> • *32 people and 35 cattle lost their lives. • Huge debris in the form of Satluj partially blocking the Satluj and formed a lake. • Flash flood caused heavy damage due to change in course of Satluj from left to right bank causing toe and lateral erosion at Tapri. • Washed away 19 houses. HRTC workshop along with 3 buses. • Change in course is still causing toe erosion to NH-22
6	High magnitude floods were also recorded in Beas valley during the year 1902,45,93,95. Continuous anthropogenic pressure on existing Geo-eco system has increased the severity and damaging impact of these flash floods.	
7	4 th and 5 th Sept, 1995 flash flood in Kullu valley	Flash flood in Kullu valley caused damage to the tune of Rs 759.8 million.
8	February 1993	500m road section of NH-22 washed away by Jakhri slide, Rs. 10 million losses to road and forest land, a village in upper slope was in danger.
9	4-5 and 12 Sept, 95	Flood and landslide along Beas river in Kullu valley killed 65 people. NH damaged at numerous places, loss to government and private property, road and bridges estimated US\$ 182 million
10	4-5 Sept. 1995	Flash flood along Panwi khad in Satluj valley washed away 19 houses, 3 buses, HRTC workshop and damage HPPWD rest house at Tapri
11	11 August 1997	Flash flood and landslide along Andhra khad in Pabbar valley killed 124 people, 456 cattle, washed away

		government and private building, 200m road section and damaged Andhra power house at Chirgaon Loss was estimated to the tune of Rs. 10.63 million.
12	August 1997	Cloudburst and flash flood along Satluj river killed 19 people, 464 cattle, 105 houses damaged, 10 cattle sheds and 39 hectare agriculture land. Total loss was estimated as Rs. 672.9 million
13	Flash floods on the night of 31 st July and 1 st August 2000 in Satluj valley.	Flash floods in the Satluj valley resulting in increase of level of Satluj 60 feet above the normal level. The flash flood was termed as the one that occurs once in 61,000 years. Widespread damage in the valley right from its confluence with Spiti river near Khab and all along in the downstream areas. Extensive damage 12 bridges, along with 1000 irrigation, sewerage, flood protection and water supply schemes were badly damaged. Extensive damage to hydro projects including NJPC, 135 people and 1673 cattle lost their lives. The total estimated loss was to the tune of Rs 1466.26 crore.
14	Flash floods on the night of 2 nd July 2001 in Sainj valley in district Kullu	Cloudbursts in the upper reaches of Satluj valley caused flash flood in two nallahs namely, Sainj and Jeeba affecting about 40 families, 2 bridges on Sainj and Jeeba nallahs and plenty of fertile land were washed away. Connecting road to Siund and Sainj was also washed away at a number of places. Two persons and 5 cattle perished. Some other areas in Kullu district were also affected due to excessive rains in July and the population of 6355 was adversely affected.
15	17 th to 19 th July 2001 floods in Mandi district	Excessive rains caused damage to 160 houses in Mandi district and destroyed 11 cattle and one human life lost.
16	Flash floods on the night of 29 th and 30 th July 2001 in Chhota Bhangal and Baijnath Sub-Division of Kangra District.	Caused widespread damage in the area, 12 deaths occurred due to flash floods and loss of 150 cattle was reported from the area. Bridge connecting Deol and Baijnath was washed away. Total estimated loss was to the tune of Rs 18.27 crores
17	Flash floods on the night of 9 th and 10 th August 2001 on Moral-Danda peak in the Rohru sub Division in Shimla District	Flash floods occurred along the Devidhar and Darkali area in Rampur Sub division damaging roads, bridges, water supply schemes, forest, agriculture, horticulture land, footbridges, village paths, residential houses and water mills. Loss of 3 lives and 39 cattle and destruction of private property was substantial. Total loss in both the Sub Division was 145.15 lakhs. In Rohru Sub division 7 bridges, 8 villages paths, 8 water supply schemes and one power house was damaged besides 16 houses. Whereas in Rampur Sub Division 10 bridges, 8 villages paths, 1 water supply scheme, 1 soil conservation plant, 7 residential houses and 16 water mills were damaged.
18	Flash floods in the night of 21 st and 22 nd August 2001, cloudburst in Ani Sub Division of Kullu district occurred	Due to flash flood in village Badhali 2 houses in which a couple was buried alive and their two children were injured. In village Sarli 7 people lost their lives, 15 houses were washed away besides the loss of 12 cows, 18 oxen and 40 sheep and about 115 bighas of agriculture and horticulture land was washed away.
19	Flash floods in Sihunta and Tissa areas of Chamba district on the night of 12 th and 13 th August 2001	Washed away 9 hectare of fertile land, 2 small bridges causing a total loss to property worth Rs. 2 Crore
20	Flash floods due to cloudburst in	21 people lost their lives, 21 people suffered major

	Gharsa valley on 16 th July 2003 in Kullu district	injuries and 9 are still missing
21	Flash floods in kangni nalla near Solang in Kullu district on 7 th August 2003	30 people lost their lives, 19 injured, 9 people lost their lives due to landslide near Bhang nalla
22	Flash flood in Satluj river due to breach in the Parechu lake in Tibetan catchment on 26 th June 2005	Extensive damage as a result of rise in water level of Satluj river due to breach in Parechu lake formed in Tibet catchment. Washed away the NH-22 at a number of places, 10 bridges and 8 Jeepable and footbridges damaged. A 10 Km stretch of NH-22 between Wangtoo and Samdo was washed away and various link roads were damaged. Total loss estimated to the government as well as public property was about Rs. 610 crore.
23	Flash floods during July 2005	Flash floods in Pabbar river in Rohru Sub-Division resulted in heavy losses to roads, bridges, public property buildings, residential houses, cowsheds, private land Chirgaon block was totally cut off. On July 7 th 2005 flash flood in Baspa river took place causing the loss of 6 bridges and 600m link road to Sangla. More than 3000 cattle perished in different parts of the state leading a total loss of some Rs. 55980.76 Lakhs

2.15.7 Vulnerability to Drought:

Drought vulnerability of state is primarily due to the fact about two-third of rural population of the state is dependent on agriculture & horticulture for earning their livelihood. Only about 23% of the total agriculture land is irrigated and the remaining land under agriculture has to depend on rain for irrigation. Uncertainties of nature render majority of people highly vulnerable. Limited options due to climatic conditions couple with small size of operational holdings add further to the vulnerability conditions.

As per meteorological criteria no area in the state could be termed as chronically drought prone but districts of Kangra and Una have experienced frequent droughts in the past. The factors that are responsible are exogenous in character and dependency on agriculture and allied livelihood is so high that even a small and seasonal change in weather component can create adverse impact on rural populace and force them to borrowing from moneylenders or banks.

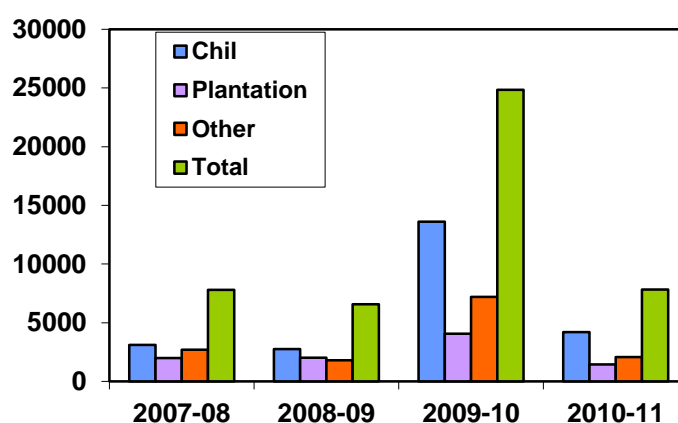
2.15.8 Vulnerability to Landslides:

Occurrence of landslides and landslips is a common feature in the state. Hydro-meteorological conditions and fragile structural fabric of geological strata are primarily responsible for the slides. Anthropogenic factors such as removal of vegetation cover, overloading of slopes by derbies also contribute to a great extent. Development activities like construction of roads, tunnels and excavation for hydro projects have further accentuated the problem. Loss of life, damage to buildings, soil erosion, loss of tree cover, damage to bridges, communication lines and hydropower infrastructure are some of the common impacts the landslide and slips cause in the state. The available data on landslide indicates that about **1 percent** of the total geographical area of the State is affected by the landslides of all kinds. Out of which severely and very severely affected areas constitute **about 0.10%**. From the severity perspective the districts can be divided into three vulnerable zones. **Chamba, Kullu as very highly vulnerable where severely affected area is more than 1500 to 2000 sq km. Mandi, Kinnaur, Shimla and Sirmour as highly vulnerable area where severely affected area is 500 to 1500 Sq Km and Bilaspur, Kangra, Lahaul Spiti, Sirmour constitute third zone with severely affected area is less than 500 Sq Km.** Districts of Hamirpur and Una has negligible area in this category. Every year one or the other stretches of the roads are blocked due to landslide or huge rock mass causing loss to life & property.

2.15.9 Vulnerability to Fires:

Forest and building fires is a common phenomenon in the state of Himachal Pradesh. Precious life and property is lost on account of this disaster in almost all parts of the state. According to one estimate about 90% of forest fires are human induced. Sometimes during summer when there is no rain for months the forests become littered with dry senescent leaves and twigs which are prone to fire when ignited by slightest spark? Human negligence, throwing smoldering stubs of cigarettes, cooking in the forest is some of the reasons for forest fires. Forest fires not only deplete forest wealth but destroy precious flora and fauna as well. The severity of problem may be judged from the forest fire of 1995 spreading across Uttarakhand & Himachal in which direct loss incurred was to the tune of Rs. 1750 million. It is apparent from the table given below that the frequency of forest and domestic fires are very high and resultant damage & loss is also considerable.

Forest Fires Affected Area (ha.)



Urban and village fires are also common in the state and especially in high hill areas of Shimla district where traditional building material is wood and social habits and lifestyle is very conducive for fire events. Haphazard growth of towns and habitations also render them susceptible to fires of all types. Cluttering and clustering of buildings of all ages is also factor contributing to high vulnerability. For instance, in certain parts of Shimla city ignition of fire at one point can engulf the whole locality. Rural villages in the state are particularly vulnerable because the construction of houses involve use of substantial quantity of timber and fuel wood as source of energy for cooking and warming. Every year there are numerous incidences of fires causing human, animal and material loss. The destruction of Malana village in Kullu and Chachawari village in Rohru area of Shimla district are the recent instances of fire hazards in the State.

Table 2.29 Incidents of Village & Urban fire

Year/District	No. of Fire Stations	No. of Fire Calls attended	No of human lives		No of cattle lives		Value of property (Rs. In Lakhs)	
			Saved	Lost	Saved	Lost	Saved	Lost
2004	2	1049	8	3	5	2	18618	1449
2005	22	1226	12	33	-	4	20018	2357
2006	22	867	8	6	3	47	20739	10035
2007	20	1202	306	102	13	38	27091	2984
2008	22	1233	-	113	-	-	38012	10302
2009	22	1684	30	20	-	32	76521	11317
2010	22	1447	14	7	7	82	71858	68013
1. Bilaspur	1	40	-	-	-	-	286	63
2. Chamba	1	24	-	-	-	-	570	274

3. Hamirpur	1	151	-	-	-	-	349	99
4. Kangra	3	217	1	-	-	6	3078	1264
5. Kinnaur	1	7	-	-	-	-	13	17
6. Kullu	2	75	1	3	-	37	1715	381
7. L&S	-	-	-	-	-	-	-	-
8. Mandi	1	50	4	-	-	-	656	51
9. Shimla	5	265	-	2	-	27	11364	1064
10. Sirmour	2	143	-	1	7	4	16611	450
11. Solan	4	361	5	-	-	-	35999	2932
12. Una	1	114	3	1	-	8	1216	204

Source: Chief Fire Officer, Himachal Pradesh

2.15.10 Vulnerability and Risk mapping:

The existing understanding and perception of Vulnerability is based on macro level hazard threat and as per Vulnerability Matrix (Table 2.30). Based on this vulnerability perception a vulnerability map for the state of Himachal Pradesh has been prepared. It is apparent that earthquake vulnerability and associated risk is widespread cutting across the administrative and physical boundaries. This, when seen in association with the population concentration, nature of construction, concentration of institutions like schools and infrastructure three distinct vulnerability & risk zones could be delineated in the state of Himachal Pradesh.

Table 2.30 Hazard vulnerability Matrix

Sr. No.	District	Total Population	Population Density	Area (%) under Seismic Zone-V liable to design severest intensity	Buildings in 'A' categories (%)	Infrastructure Risk	Earthquake Intensity %(Nos)	Area prone for severe high land slides	Flood Hazard, Excess rainfall intensity	Drought Frequency (%)
1.	Chamba	5,18,844	80	53.2	92.25	High	33.63 (186)	2120	High 49	3
2.	Hamirpur	4,54,292	406	90.9	85.72	Medium	0.36 (2)	0	Low 13	13
3.	Kangra	15,07,223	263	98	81.37	High	7.05 (39)	123	Medium 3	26
4.	Kullu	3,81,571	79	53.1	89.91	Very High	3.44 (19)	1820	Very High	-
5.	Mandi	9,99,518	253	97.4	93.02	High	9.58 (53)	968	High 18	18
6.	Bilaspur	3,82,056	327	25.3	88.58	Medium	0.18 (1)	216	Low 11	16
7.	Una	5,21,057	338	37.0	52.68	High	0 (0)	2	High 6	32
8.	Solan	5,76,670	298	2.4	69.06	High	0.72 (4)	556	Low -	-
9.	Kinnaur	84,298	13	-	74.72	High	16.82 (93)	868	Very High	-

10.	Lahaul & Spiti	31,528	2	1.1	64.38	Low	17.90 (99)	127	Low	-
11.	Shimla	8,13,384	159	-	78.14	High	8.86 (49)	893	Very High	-
12.	Sirmaur	5,30,164	188	-	82.74	High	1.45 (8)	95	Medium 13	15

Zone-A: Very High Vulnerability Risk Zone

This zone constitutes areas falling in Zone-V as per seismic zoning map of India. With maximum concentration of population (60%), schools (59%) and heavy concentration of infrastructure the physical, social and economic vulnerability of this zone is very high. Most parts of districts **Kangra, Mandi, Hamirpur, Kullu and Chamba constitute this zone.**

Zone-B: High to Moderate Vulnerability & Risk Zone

Most parts of districts **Bilaspur, Solan, Una, Sirmour, and Shimla & Kinnaur constitute this zone.** Population concentration in this zone is as high as 38% of the total population and equal number of school concentration is observed in this zone. Vulnerability of urban centers in this zone like Shimla, Solan, Una, and Ponta Sahib is also relatively more. Over all the vulnerability & risk associated with this zone has been termed to be high.

Zone-C: Moderate to Low Vulnerability Risk Zone

This zone constitutes most parts of **Lahaul & Spiti, northern parts of Chamba, Kullu, Kinnaur & Kangra districts** where population concentration is as low as 3% of the total population. Even though the past seismicity suggests that seismic hazard threat in the Lahaul Spiti sector is relatively more but due to low density of population the associated vulnerability and risk is moderate to low.

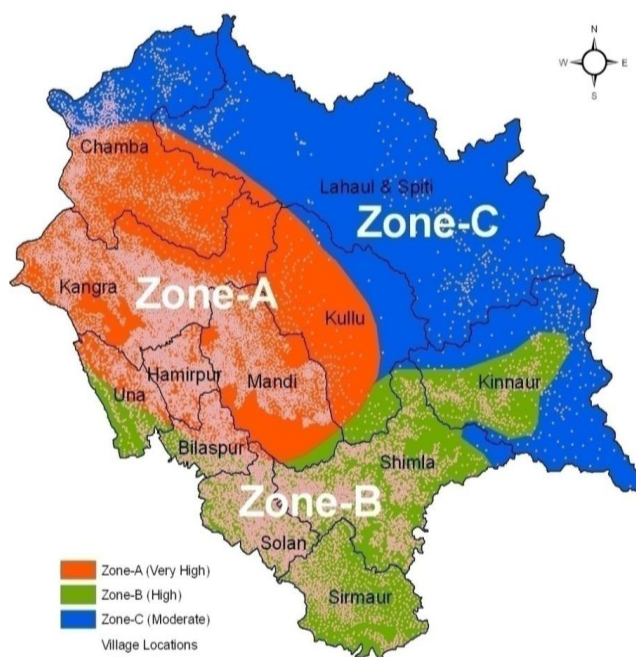


Figure 2.10 Vulnerability & Risk Zones of Himachal Pradesh (Villages)

2.15.11 Vulnerability to Climate Change

Recent flash floods occurred in the Satluj basin receiving its seasonal flow from snow melt and glaciers besides rainfall have added new dimension to the hazard vulnerability of river basins situated in the state of Himachal Pradesh. Intense and excessive rainfall resulting in cloud bursts coupled with rapid melting of snow and glaciers due to rising temperatures has been identified as the main cause for the flash floods. One of the consequences of glaciers retreat that has been a cause of concern and worry to the people of Himachal Pradesh is the formation and expansion of glacial lakes high up in the mountains in the upper reaches of glacier-fed river systems. A glacier outburst flood caused by moraine dammed lakes is a common feature in the glaciated terrain. In the world many events of such outburst floods have been reported in the North America, Europe and in the Himalayas. So far in the HKH region the bursting of such lakes have been reported from Manalu region, Central Nepal and in Bhutan. However no systematic records of glacier lake outbursts from Indian Himalayas are available. In Himachal Pradesh more than 268 water bodies or wetlands have been mapped in areas above 3200 meter elevation. The melting of glaciers and snow fields in the state has reported to be on rise. Sometimes glaciers retreat melt water is blocked by glacier debris forming a lake behind the newly exposed terminal moraine. The formation of lakes due to glacier melting and damming by moraines and subsequently their bursting may lead to catastrophic discharge water pressure causing huge floods resulting in loss of precious lives and infrastructure. This phenomenon is known as GLOF i.e. glacial lake outburst floods.

As per the records available in Gazetteer, Lahaul & Spiti, "the Bara Shigri Glacier burst its bounds and dammed the Chandra, causing the formation of a large lake, which finally broke loose and carried devastation down the valley. The story runs that the people of Spiti posted guards in the Kunzam Pass to watch whether the water would rise high enough to flow across into Spiti."

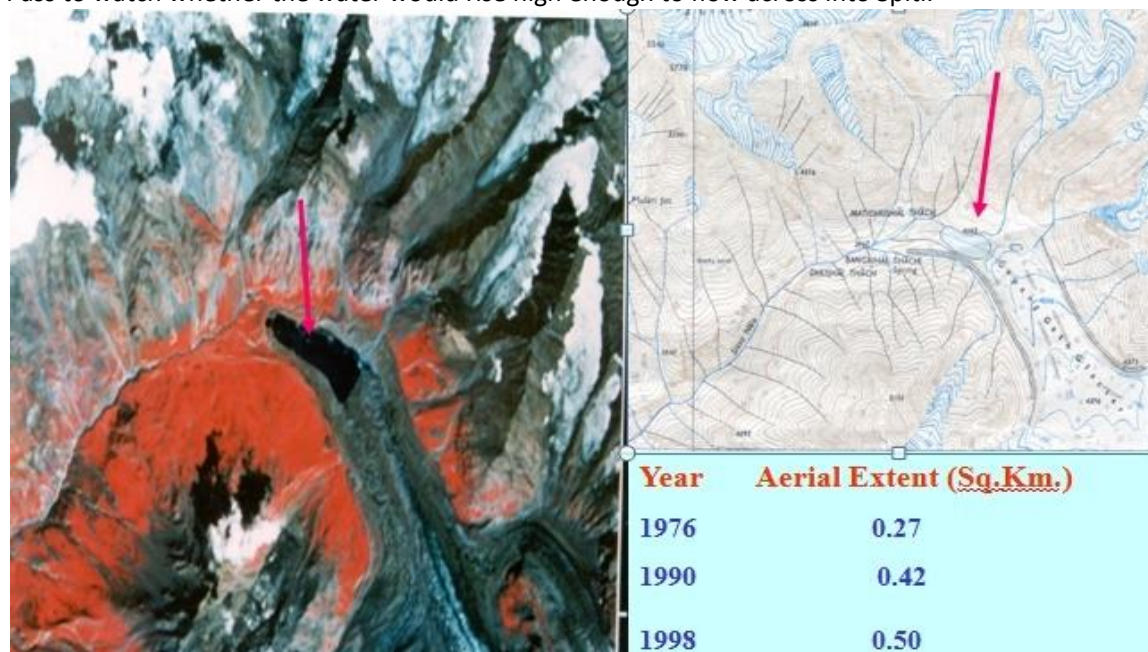


Figure 2.11 Satellite view of moraine dammed lake near the snout of Geepang Gath glacier in Chandra river basin

Source: Randhawa & Sood et. al.

Table 2.31 Glacier retreat in Baspa Basin, Himachal Pradesh from 1962-2001

Glacier No.	Glacier No. in Datasheet	Glacier Area (Sq. Km.)		Loss in Area (%)	Snout altitude (m. asl)	
		1962	2001		1962	2001
1	53107001	10.5	8.7	17	4480	4560
2	53107002	4.6	4.3	6.5	4520	4720
3	53107003	2.2	2.0	9	4600	4640

4	53I07004	4.6	4.1	11	4720	4720
5	53I07005	1.7	1.2	29	3920	4360
6	53I11013	3.2	3.2	0	4920	4920
7	53I11014	1.5	0.8	47	5000	5080
8	53I12001	5.9	5.6	5	4760	5000
9	53I12002	38.4	33.5	13	4320	4360
10	53I12003	2.7	2.2	19	4480	4480
11	53I11009	7.1	5.0	30	4600	4600
12	53I11010	6.9	5.8	16	4640	4640
13	53I11011	8.7	4.5	48	4760	4760
14	53I07006	35.2	30.4	14	4200	4240
15	53I07007	11.6	9.9	15	4240	4240
16	53I07008	5.5	4.1	26	4360	4360
17	53I07009	3.9	1.9	51	4200	4440
18	53I07010	8	7.0	13	4360	4400
19	53I07011	10.8	6.1	44	4080	4320
Total Area / Average Altitude		173	140.3	18.9	4482	4570

Source: Kulkarni, et al., 2004

CSK HPKV, Palampur and ICIMOD, Nepal, have created an inventory of glacial lakes and identified the potential of GLOF sites for Himachal Pradesh. The study points out that of the 156 lakes mapped, **16 lakes in Himachal were found to be dangerous**. The potentially dangerous lakes identified are located within four basins. i.e. five (5) in the Beas basin, five (5) lakes in the Chenab basin, one (1) in Ravi and three (3) lakes are located in Satluj basin.

Similar inventory of moraine dammed lakes undertaken by H.P. State Council for Science, Technology and Environment and Space Applications Centre Ahmedabad for Satluj basin indicated the presence of 50 moraine dammed lakes and 5 supra glacial lakes with largest lake having an area of 1.053 sq. km and the smallest 0.002 sq. km. inventory in the Chenab basin suggest the presence of 17 moraine lakes and two supra lakes.

At times climate induced disasters resulting in response to intense long lasting rains could also trigger landslides, erosion and increased sediment yields in the drainage systems as the slopes in the upper catchment and in glacial topography are generally steep and unstable. Besides precipitation, the frequent seismic activity and permafrost thawing can also trigger landslides resulting in the damming of river channel forming lakes. These natural dams cause valley inundation upstream and when subsequently breached by lake water pressure results in flash floods or debris flows downstream causing heavy loss to life and property. This phenomenon is called LDOF. Recent event of Parechu lake outburst is one such event that has given new dimension to the possibility of lake formation due to geo-environmental factors. The satellite image analysis of August 2000 floods also showed the presence of huge water body or lake upstream in the Satluj basin before the flash flood took place. The cause of formation of these lakes is still a matter of conjecture whether landslide were triggered by natural slope failure or by deliberate human action, the fact remained that the lake disappeared immediately after the flash floods hit the Himachal part of Satluj basin. Huge infrastructure of hydropower projects located in different basins of the state in particular is at risk to the phenomena of GLOF & LDOF.

Recently very comprehensive studies on climate change and apple production scenario for Himachal Pradesh has been carried out by Prof. Verma and his colleagues at Y. S. Parmar University of Horticulture and Forestry Solan. Based on the analysis of data pertaining to the two stations at Shimla and Solan they have drawn the following inferences:

- The mean maximum temperature at Shimla showed an increasing trend for the period 1976-80 to 2006-2007.
- Mean minimum temperature increased from 8.42c in 1976-80 to 9.20c in 2006-2007
- Both rainfall and snow precipitation showed a negative trend. Rainfall at Shimla in 1973 -75 was 1346.-93mm which reduced to 816.15 mm in 2006-2007
- About 17% decrease in rainfall was observed from 1996-2000 onwards till 2007
- Total snowfall received during 1973-75 period was 190.53cm which in 1981-85 increased to 827.38 cm, declined to 101.90cm in 1986-1990 further reduced to 78cm in 2006-07 and it was only 15 cm in the year 2009
- The decreasing trend in seasonal snow fall at Shimla is very conspicuous since 1990 and it was lowest in 2009.

The future climate scenario as worked out for the period from 2021-2050 using HadRM3 modal scenario AIB indicates that:

- The rise in temperature in subtropical and sub-temperate covering districts of **Solan, Sirmour, Una and Mandi** will be to the order of **2.43-1.73 with a seasonal average of 2.08c**
- In sub-temperate to temperate climate conditions covering the districts of Shimla, Kullu, Lahaul & Spiti, Kinnaur and Chamba the maximum temperature are likely to increase **by 2.77°C** and minimum temperature by **2.17°C with a seasonal average of 2.47°C**
- District wise winter (Nov-Feb) temperature and rain fall projected scenario suggests that both **Kullu and Shimla districts** will experience maximum rise in temperature and fall in precipitation.

The projected future climate change scenario for the state of Himachal Pradesh will increase the occurrence and frequency of hydro meteorological hazards such as floods drought and GLOF and LDOF besides the localized disaster such as landslides, avalanches etc.

Table 2.32 Gross increase in winter mean air temperature in the last two decades in H.P.

Sr. No.	Station Name	Mean Max in °C	Mean Min in °C	Average Winter °C
1	Bahang (2,192)	4.0*	1.8*	3.8*
2	Solang (2,480)	4.4*	2.0*	3.8*
3	Dhundi (3,050)	5.6*	1.0	3.2*
4	Patseo (3,800)	3.0*	-3.0*	0.0
5	Shimla (2,200)	2.8*	2.2*	2.4*
Average		3.2	0.8	2.2

Source: Bhutiyani et al. 2007

Table 2.33 District-wise winter (Dec.-Feb.) temperature in Himachal Pradesh for Mid period (2021-2050) (based on HadRM3 Model Scenario AIB)

	T _{max} (°C)	T _{min} (°C)	Average (°C)
i) Sub tropical – Sub temperate region			
Bilaspur & Hamirpur	1.84 (1.98)	2.45 (2.20)	2.14 (2.09)
Solan & Sirmaur	1.64 (1.77)	2.19 (2.04)	1.91 (1.90)
Una	1.34 (1.45)	2.36 (2.07)	1.85 (1.76)
Mandi	2.19 (2.34)	2.79 (2.18)	2.49 (2.26)
Kangra	1.71 (1.79)	2.36 (2.19)	2.03 (1.99)

Average Temperature	1.74 (1.87)	2.43 (2.14)	2.08 (2.00)
ii) Sub-temperate - Temperate region			
Shimla	2.51 (2.75)	2.54 (2.38)	2.52 (2.56)
Kullu	2.04 (1.85)	2.78 (2.53)	2.41 (2.19)
Lahaul & Spiti	2.24 (2.14)	2.82 (2.50)	2.53 (2.32)
Kinnaur	2.06 (1.91)	2.71 (2.53)	2.38 (2.22)
Chamba	2.00 (1.98)	2.99 (2.37)	2.49 (2.17)
Average Temperature	2.17 (2.13)	2.77 (2.46)	2.47 (2.29)
* Figures in brackets are average values of Dec-Feb months, only			

Source: Verma et al. 2011

2.16 Risk Identification

As described in the previous section, the State of Himachal Pradesh is highly vulnerable to various natural and man induced disasters. This coupled with vulnerability factors like limited awareness on disaster risk reduction; inadequate preparedness and improper planning have contributed significantly to the increased risk to the people. It is certainly possible to reduce the potential impact of disasters by evolving appropriate preparedness, preventive and response plans. Risk identification and assessment constitutes the first step in developing the State plan.

2.17 Population at Risk

GIS based sample assessment indicates that about 54% of villages having 59% of population are located in highest vulnerable zone. Likewise about 41% villages with 38% population are located in the high risk zone and only 5% villages with 3% population in moderate to low risk zone. Hence 97% population in the state is located in high to very high seismic risk zone. This when viewed in conjunction with building topology and population density portrays very high risk scenario for the state requiring immediate attention.

2.18 Hydro Power Infrastructure at Risk

Besides buildings, factories, institutions, hydropower infrastructure which is considered crucial to sustain the country's economic growth is at risk. The state has identified potential of hydropower to the tune of 23,000 MW and of which 6150 MW is operational. In terms of economics the investments in hydropower sector amounts more than 60,000 crores in different basins of the state which is likely to increase to aggregate capacity of 12500 MW with an investment of Rs 1 lakh crore by the year 2022.

Table 2.34 River Basins and Hydropower Capacity

Name of Basin	Capacity (MW)
Yamuna	811
Satluj	10355
Beas	5339
Ravi	2952
Chenab	2973
Self / New Identified	570
TOTAL	23,000

Apart from Mega projects 45 small hydro projects with an aggregate capacity of 177.55MW have been commissioned in various basins and by the year 2014 the small hydro development is expected to increase to 500MW. It is pertinent to note that apart from potential threat of floods the mega

projects such as Pong Dam, Bhakra Dam, Pandoh Dam, Chemera, Parvati and Kol Dam are all located in highest vulnerable zone where seismic risk is also very high.

2.19 Schools, Educational and Health infrastructure at risk

In the year 2010 the state as whole had 10,767 primary schools, 2303 middle schools, 2094 higher secondary schools and 88 Colleges. 59% of these institutions are situated in highest vulnerable zone and 38% in high vulnerable and only 3% in moderate to low vulnerable zone.

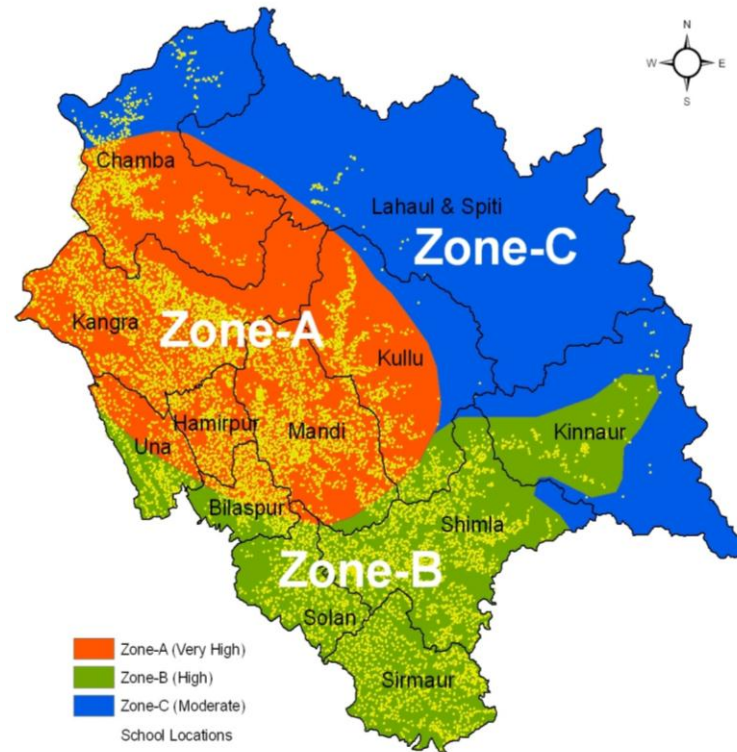


Figure 2.12 Vulnerability & Risk Zones of Himachal Pradesh (Schools)

Similarly out of 605 medical institutions (Hospitals(52), Dispensaries(23), CHC/RH(77), PHCS(453) existing in the state (2010-11 data) about 48% are located in districts falling in highest vulnerable zone and 44% in high vulnerable zone only about 8% institutions are located in areas with moderate to low vulnerable zones.

2.20 Socio Economic Vulnerability of Himachal Pradesh

Besides the heavy concentration of total population, educational institutions and high percentage of vulnerable houses existing in highest vulnerable and risk zone the concentration of socially vulnerable groups is also very large in this zone. It is apparent from Table 2.37 and Table 2.39 that the districts of Chamba, Mandi, Kangra, Kullu & Hamirpur that constitute Zone-A has also maximum population of physically challenged people (61%) and social security pensioners (60.6%). 90% of population being rural uncertainties of nature affect their livelihood in farm sector with small size of operational holdings. Their coping capacity is very limited to deal with situations resulting from total failure of crops of all types including high value commercial crops like apple. Vulnerability of people in high altitude areas is further accentuated due to the limited working season and erosion of traditional coping strategies like diversification, mixed cropping, reciprocation and resource pooling.

Table 2.35 Age-wise Distribution of Population 2001 Census

Age group	Rural Population	Urban Population	Total population
0-4	517539	42648	560187
5-9	566404	527760	619164
10-14	644995	60044	705039
15-19	564788	61836	626624
20-24	515945	67084	583029
25-29	458593	58914	517507
30-34	381339	51336	432675
35-39	362046	49016	411062
40-44	291109	39560	330669
45-49	270052	32830	302882
50-54	214098	24147	238245
55-59	171610	16927	188537
60-64	161344	12786	174130
65-69	119674	9232	128906
70-74	99721	6986	106707
75-79	53005	3860	56865
80+	76577	4379	80956
Age Not Stated	13480	1236	14716
All Ages	5482319	595581	6077900

Source: Census of India 2001

Vulnerability of children and women is also very. The GIS based analysis revealed that 60% of total education institutions in the state are located in the very high risk zone. The population of age group from 5 to 15 is also very high in high risk area. Vulnerability of these children and risk involved is very high in the event of earthquake if that happens during day time when most of the children will be in their class rooms. Women are vulnerable because they constitute large group population of marginalized workers as their coping capacity is relatively much less.

Table 2.36 District-wise Social Vulnerability in Himachal Pradesh

District name	Area (sq.k m.)	Population	females per 1000 males	Density per sq.km.	Urban population (in percent)	Literacy (in percent)	Percent Villages with infrastructure
Kangra	5,739	13,38,536	1025	233	5.39	80.68	37.30
Mandi	3,950	9,00,987	1013	228	6.77	75.86	12.22
Shimla	5,131	7,21,745	896	141	23.12	79.68	25.57
Solan	1,936	4,99,380	852	258	18.26	77.16	22.52
Chamba	6,528	4,60,499	959	71	7.50	63.73	31.02
Sirmaur	2,825	4,58,351	901	162	10.38	70.85	10.67
Una	1,540	4,47,967	997	291	8.80	81.09	17.19
Hamirpur	1,118	4,12,009	1099	369	7.32	83.16	13.58
Kullu	5,503	3,79,865	927	69	7.92	73.36	45.93
Bilaspur	1,167	3,40,735	990	292	6.44	78.80	35.37
Kinnaur	6,401	8,3,950	857	13	--	NA	15.25

Lahaul & Spiti	13,835	33,224	802	2	--	73.13	23.07
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Source: Census of India 2001

Table 2.37 District Wise Physically Challenged People (PCP) in HP as on Feb 2011

Sr. No.	Districts	VI	HI	OI	MR	TOTAL
1	Bilaspur	309	355	1329	359	2352
2	Chamba	583	578	1669	452	3282
3	Hamirpur	628	771	3037	976	5412
4	Kangra	1992	1817	7932	2302	14043
5	Kinnaur	240	143	837	44	1264
6	Kullu	1093	1048	1946	483	4570
7	Lahaul & Spiti	172	123	274	36	605
8	Mandi	2257	3729	6550	1070	13606
9	Shimla	1419	1390	4082	572	7463
10	Sirmaur	781	1057	2699	573	5110
11	Solan	478	581	3359	682	5110
12	Una	659	332	2535	599	4125
	Total	10611	11924	36249	8148	66932

Source: Statistical Outline of Himachal Pradesh 2010-11

Table 2.38 Unemployed Registered with Employment Exchanges in H.P. (Jan 2011)

Sr. No.	District	Registration	Vacancies	Submission	Placement	Live Register (31.01.2011)
1	Bilaspur	6882	72	10377	141	52758
2	Chamba	6243	82	9822	222	57634
3	Hamirpur	7059	17	6338	204	65195
4	Kangra	22098	532	12775	515	184483
5	Kinnaur	1499	1481	1257	20	7853
6	Kullu	4960	63	1136	30	48635
7	Lahaul & Spiti	427	1	5	0	5701
8	Mandi	18329	195	12406	384	146969
9	Shimla	9184	525	8084	342	92888
10	Sirmaur	8487	939	9470	234	48518
11	Solan	7087	1190	7685	647	55051
12	Una	9152	438	10586	445	58747
	Total	1,01,407	5,535	89,941	3,184	8,24,432

Table 2.39 Social Security Pensioners in H.P. - Most Vulnerable Population

Sr. No.	Name of Distt.	National Indira Gandhi Widow Pension	Old age pension	Widow Pension	Old widow pension	National Indira Gandhi Pension	Handicapped allowance	Patient Allowance	Total
1	Bilaspur	5944	6611	245	2972	10	1486	42	17310
2	Chamba	8944	5463	452	5553	2	1828	291	22533
3	Pangi	59	596	13	340	0	94	9	1111
4	Bharmour	980	872	7	811	0	220	32	2922
5	Hamirpur	6567	3965	966	3565	22	1952	10	16947
6	Kangra	21678	7500	570	11642	14	7056	99	48559
7	Kullu	5662	4265	459	4155	9	2268	81	16899
8	Mandi	10048	26359	954	14003	35	5444	224	57067
9	Shimla	15742	9210	1198	5666	8	2470	248	34542
10	Dodrakwar	309	196	0	66	0	89	1	661
11	Sirmour	5151	4741	885	4068	21	2373	314	17553
12	Solan	3800	1935	454	2996	22	1187	45	10438
13	Una	5055	3578	1504	2929	21	1557	45	14689
14	Kinnaur	996	1770	140	708	7	417	41	4079
15	Lahaul	379	355	53	153	18	263	0	1221
16	Spiti	126	348	57	146	2	72	0	751
		91440	77763	7957	59773	191	28676	1482	267282

Chapter III - Preventive Measures and Mitigation Plan

Himachal is vulnerable to 25 types of hazards out of 33 identified by the High Powered Committee (HPC) of Government of India falling into 5 sub-groups. Apart from hazard by HPC, state has high impact of Human animal conflict which needs to be addressed as hazard.

Water and Climate Related Disasters

1. Floods
2. Hailstorm
3. Cloud Burst
4. Heat Wave and Cold Wave
5. Snow Avalanches
6. Droughts
7. Thunder and Lightning

Geologically Related Disasters

8. Landslides and Mudflows
9. Earthquakes
10. Dam Failures/ Dam Bursts

Chemical, Industrial and Nuclear Disasters

11. Chemical and Industrial Disasters
12. Nuclear Disasters

Accident Related Disasters

13. Forest Fires
14. Urban Fires
15. Major Building Collapse
16. Serial Bomb Blasts
17. Festival related disasters
18. Electrical Disasters and Fires
19. Air, Road and Rail Accidents
20. Boat Capsizing
21. Village Fire

Biologically Related Disasters

22. Biological Disasters and Epidemics
23. Pest Attacks
24. Cattle Epidemics
25. Food Poisoning

3.1 Specific Hazards and Nodal Departments in Himachal Pradesh

Table 3.1 Specific Hazards and Nodal Departments in Himachal Pradesh

Sr. No.	Hazards specific	Nodal Departments	Supporting Agencies / Departments For Early warning systems
1	Earthquake	Dept. of Environmental Science and Tech HP	IMD, Ministry of Earth sciences/Geological Survey of India, Wadia Institute of Himalayan Geology
2	Landslides	PWD	IMD, Ministry of Earth sciences, Wadia institute of Geology, RS Environment SC& T. BRO, Urban Development.
3	Floods/Flash Floods/Cloud Burst	IPH	IMD,CWC, Department of ES&T

4	Fire	Fire Department	IPH, Health and Admn., Home
5	Forest Fire	Forest Department	Fire Department, RS, Home and Admn.
6	Drought	Agriculture	IMD, Revenue, RD, DRDA, Nauni and Palampur university , Horticulture, S&T
7	Road Accidents	Concerned DA	Transport, PWD, BRO, home and Health, District Road Safety Committees
8	Civil Aviation Accidents	GAD	Health and Family welfare, Admn. and Home, Department of Tourism and Civil Aviation
9	Rail Accidents	Indian Railway	Health and Family welfare, Admn. and Home
10	Boat capsizing	MPP & power(HPSEB)	District DDMA, Home and Health and Family Welfare
11	Stampede	Home	Admn, Health and Family Welfare & Art Language and Culture
12	Terrorism & Crisis events	Home	Admn, Health and Family Welfare & Art Language and Culture
13	Industrial	Department of Industry	Labour & Employment, Admin, Home, Pollution Control Board
14	Chemical	Environment and Science	Industry/ Department Labour, Home, Admn, NDRF
15	Biological	Health and Family Welfare	Home, Admn, NDRF
16	Radiation	Environment and Science	Home, Admn, NDRF
17	Nuclear	Environment and Science & Tech.	Home, Admn, NDRF, Central Ministry of Atomic Energy and Defense
18	Mines collapse / mishaps	Department of Industry(Geology wing)	Pollution control Board, Department Of Health and Forest
19	Wind Storms	Revenue	IMD, Agriculture and Horticulture, home
20	Hailstorms	Agriculture and Horticulture	IMD, home and Insurance, Admn
21	Extreme Cold	Department of Revenue, District AC	IMD, Forest, Electricity, Health, Home
22	Snow Storms	Revenue	IMD, IPH, Health and Admn, Home, PWD
23	Avalanches	SASE, ES&T	Tribal Administration, IMD, IPH, Health and Home and Revenue
24	Dam / Reservoir Burst	MPP & Power, HPSEB	IPH, Environment Science and Technology, CWC and Administration

3.2 Early Warning and Dissemination Systems

3.2.1 Nodal Agencies for Early Warning:

Following are the Nodal agencies in the Government of India and in the state mandated for early warning of different natural hazards prevailing in the state of Himachal Pradesh:

Table 3.2 Specific Hazards and Nodal Departments in Himachal Pradesh

Disasters	Agencies	Agencies at State level
Cyclone	Indian Meteorological Department	Agriculture Department
Tsunami	Indian National Centre for Oceanic Information services	N/A

Floods	Central Water Commission	IPH
Landslides	Geological Survey of India	Geology wing of industry department.
Avalanches	Snow and Avalanches Study Establishment SASE(DRDO)	Department of Environment Science & Technology
Heat & Cold Waves	Indian Meteorological Department	Department of Revenue

State agencies will coordinate with central agencies. These agencies shall be responsible for keeping track of developments in respect of specific hazards assigned to them and inform the designated authorities/agencies at National, State and District levels about the impending disasters. All these agencies would develop guidelines for early warning of disasters.

3.2.2 Hydro-meteorological Hazards:

IMD has established an elaborate network of observatories (Figure 7.1) in the state of Himachal Pradesh. General weather bulletins are issued twice a day based on -3 and 12 UTC observations throughout the year including forecasts for 24 hrs and weather warnings for next 48 hrs. The information is disseminated through electronic media, radio and print media on a regular basis.

Weather warnings for extreme weather such as heavy rainfall, heat and cold wave squall and hail are issued as and when situation so develops.

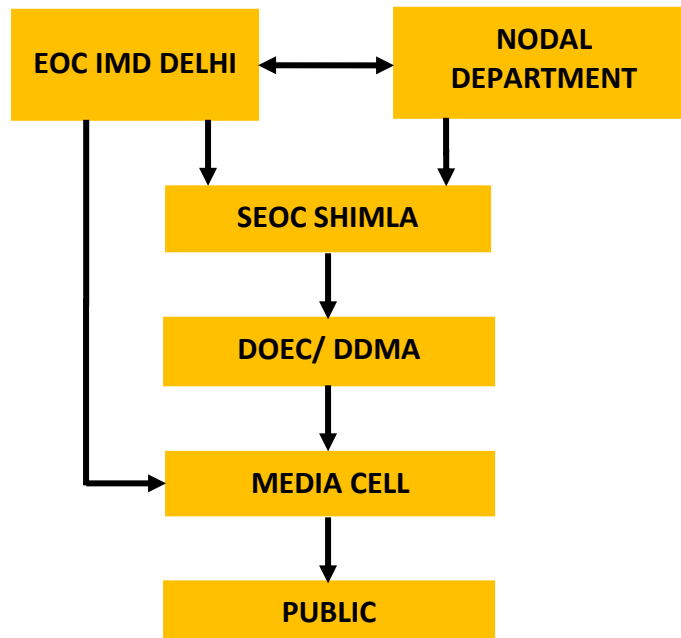
Local forecasts for the capital cities and other important cities are provided four times a day with 48 hrs validity. The IMD information is available in website www.imd.gov.in

As far as forecasting cloud bursts the most devastating weather event presently there is no technique for anticipating the cloud burst because of its localized nature. A very fine network of radars may help in future.

3.2.3 Earthquake:

Early warning or prediction of earthquake is not possible. India Meteorological Department (IMD) is the agency of Govt. of India responsible for monitoring seismic activity in and around the country. The IMD quickly estimates the earthquake source parameters on occurrence of earthquake and disseminates the information to all the concerned agencies responsible for relief and rehabilitation measures.

An earthquake operational centre is functioning on a 24x7 basis at IMD headquarters in New Delhi which keep round the clock watch of seismic activity through a country wide National Seismological Network(NSN). IMD has four observatories in Himachal Pradesh for dam related studies under the BBMB. Observatory at Shimla & Dharamshala are equipped with State-of-art broad band sensors, high dynamic range(24-bit) digitizes, GPS time synchronisation and facility to access data remotely through satellite communication and telephone mode. The State EOC will have a communication link with operational centre and nodal department science & technology which will provide and process the state specific information for further dissemination through the following mechanism-



Information Flow Mechanism at State EOC

3.2.4 Flood:

Central Water Commission has developed a network of flood forecasting stations and issues Daily Flood Bulletins to all designated Authorities/Agencies of the Central Government and State Governments/ district Administration during the South East Monsoon season for all the major river basins in the following categories:

- **Category IV: Low Flood** (Water level between Warning Level and Danger Level)
- **Category III: Moderate Flood** (Water Level below 0.50m. less than HFL and above Danger Level)
- **Category II: High Flood** (Water Level less than Highest Flood Level but still within 0.50m. of the HFL)
- **Category I: Unprecedented Flood** (Water Level equal and above Highest Flood Level (HFL))

3.2.5 Landslide:

Geological Survey of India issues alerts and warnings to all designated authorities and agencies of the Central Government and State Governments/ district Administration for landslides in the following categories.

- **Category IV:** Landslides of small dimensions that occur away from habitations and do not affect either humans or their possessions.
- **Category III:** Landslides which are fairly large and affect infrastructural installations like strategic and important highways and roads, rail routes and other civil installations like various appurtenant structures of hydroelectric and irrigation projects
- **Category II:** The landslides that may occur on the fringes of inhabited areas and result in limited loss of life and property.
- **Category I:** Landslides of large dimensions that is located over or in close vicinity of inhabited areas like urban settlements or fairly large rural settlements. Activity on these slides can result in loss of human lives, dwellings on large scale.

3.2.6 Avalanches:

Snow and Avalanche Study Establishment (SASE) of the Defence Research and Development Organisation (DRDO) Chandigarh is responsible for issuing alerts and warnings to all designated authorities and agencies of the Central Government and State Governments/ district Administration for avalanches in the following category:

- **Low:** Generally favourable condition. Triggering is possible only with high additional loads and on very few extreme slopes. Valley movement is safe. Movement on slopes with care.
- **Medium:** Partly unfavourable condition. Triggering is possible on most avalanche prone slopes with low additional loads and may reach the valley in medium size. Movement on slopes with extreme care. Valley movements with caution. Avoid steep slopes. Routes should be selected with care.
- **High:** Unfavourable condition. Triggering possible from all avalanche prone slopes even with low additional loads and reaches the valley in large size. Suspend all movement. Airborne avalanches likely.
- **All Round:** Very unfavourable condition. Numerous large avalanches are likely from all possible avalanche slopes even on moderately steep terrain. Suspend all movements. Airborne avalanches likely.

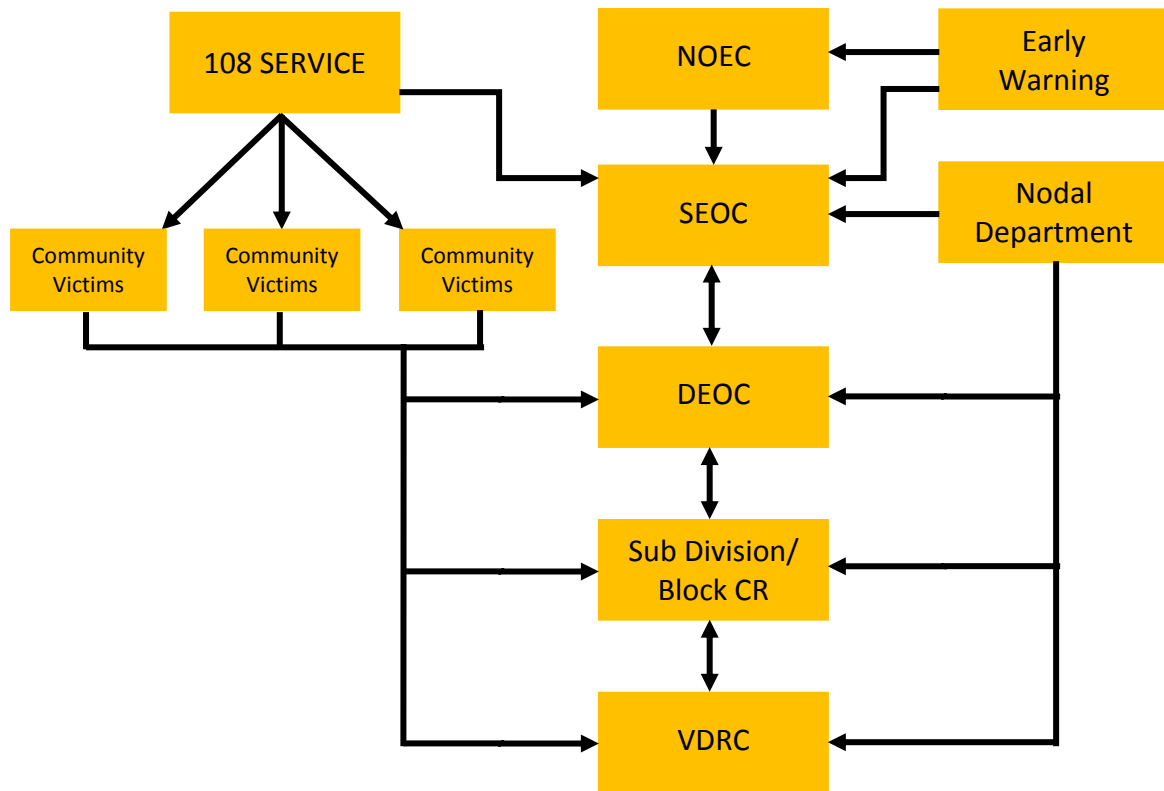
3.2.7 Hailstorms:

Hailstorms create havoc every year to crops and in fruits and vegetable belts damaging about 20-30% of crop every year in the state. In order to minimize the losses suffered by farmers and growers due to hail the Govt. through Department of horticulture has installed anti-hail guns under a project at three locations in fruit growing belt of Shimla district. Using, weather parameters responsible for hail formation, the anti-hail gun device fire acetylene gas into the clouds. In order to acquire weather data radar has been installed at Tumdoo at an altitude of 10,000 feet near Khadapathar and three hail guns are installed in Jubbal, Kotkhai and Rohru areas. Proposal to expand the network is under consideration of the Govt.

3.3 Setting up of the Emergency Operation centers

The State level EOC will be located within HP Secretariat. This EOC will strengthen the existing control room and will be the nerve center for Coordination and management of disasters. For information flow, besides its own toll free number 1070 the SEOC shall be connected to the existing network of emergency 108, Police & Fire. The calls received from victims for help or FIR will be diverted to SEOC and will then be processed as per the SEOC protocol. The SEOC shall have direct connection with NEOC and early warning networks of all nodal agencies at the national and state level. The SEOC as centralized coordination mechanism shall provide direction and control on the following:

- Receive and process alerts and warning from nodal agencies and other sources and communicate the same to all designated authorities.
- Provide data and information to SEC for taking appropriate decisions and to monitor emergency operations
- Provide and facilitate coordination between ESF agencies.
- Provide inventory of resources and requisitioning additional resources during the disaster phases.
- Provide and issue disaster specific information/data to all concerned
- Consolidate analysis and damage loss and needs assessment data.
- Forwarding of consolidated reports to all designated authorities.



Flow of Information: NOEC to Grassroots level

In order to ensure voice data and video transfer the SEOC shall have fail proof network with triple redundancy of NICNET of NIC, POLNET of Police and SPACENET of ISRO to the terrestrial and satellite based communication. All district control rooms will be connected with the SEOC. The district control rooms will be connected with the subdivision and block level nodes.

3.4 SDRF

The department of home will constitute four companies for dealing four major disasters such as earthquakes, floods, avalanches and forest fires. These companies will be located in 1st IR Bn., 2nd IR Bn., 3rd IR Bn. and 4th IR Bn. These four companies will be equipped with the following-

- Detection and location
- Extrication and Access
- Fire Fighting
- Medical First Aid

These companies will be provided state of art equipments and communication systems. 3rd IR Bn. at Pandoh will act as Nodal Agency for providing training to all personnel of police as well as Home Guards.

Regional Response Centers:

The Regional Response Centers established by MHA GOI in the state of HP are:-

- a) ITBP at Kullu
- b) ITBP at Sarahan
- c) ITBP at Rekong Peo

3.5 Emergency Health Response

3.5.1 Atal Swasthya Seva

Himachal Govt. has signed an MOU with Hyderabad based GVK-EMRI to provide free ambulance services to the patients in different parts of the state. The state of art fully equipped ambulances is being run under Atal Swasthya Seva scheme and providing quality health services to the people of the state. The scheme has proved very effective in providing prompt ambulance service and in saving lives. The service is being maintained by local youth para-medics specially trained for delivering effective medical services. The residents of Himachal Pradesh are getting 24X7 emergency services on dialing a single toll free emergency number 108. Assistance can also be obtained at this number within twenty minute for emergencies such as fire, police apart from medical. The response centre equipped with latest technology and infrastructure is located at Dharampur in Solan district. This facility will be linked with SEOC & DEOC for responding to all calls related to disaster management.

3.6 Creation of HP IAG Platform

The plan recognizes the critical role to be played by Non-Government Organizations in mobilizing the communities and in linking urban local bodies with corporate sector entities for initiating DRR related activities. The plan endeavors to utilize the linkage of NGOs with grass root communities for creating awareness on disaster risk vulnerabilities and capacity building for preparedness, mitigation and response. In order to ensure and promote synergetic actions for effective disaster risk reduction HP IAG platform has been created in the state. This forum shall function in consultation with HPSDMA and DM cell of revenue Department to address the humanitarian needs and livelihoods.

3.7 Development of State Policy on Disaster Management and issuing of Guidelines for Departments

Recognizing the fact the disaster management is a multi-agency function the HPSMDA have issued guidelines to all the departments for undertaking capacity building, training, preparation of DMPS etc. Guidelines for on-site and off-site emergency plan for factories have also been issued. The State Policy on DM has also been issued. These documents are available at HP SDMA website: www.hpsdma.nic.in.

3.8 Improving access to inaccessible areas by creating a network of helipads

In hilly areas the immediate impact of any disaster would be the breaking of road connection to the affected areas. In order to provide immediate response and relief in all such eventualities Govt. has established a network of helipads throughout the state. All DDMA and district administration would ensure connectivity to all helipads and keep them in the state of readiness for emergency situation. The spatial distribution and spread of helipads is given as per map.



Figure 3.1 Location of Helipads in Himachal Pradesh

Table 3.3 Location of Helipads in Himachal Pradesh

No.	NAME	Latitude	Longitude
1.	BARMANA	31.424167	76.830833
2.	BILASPUR	31.333333	76.750000
3.	SHAH TALAI	31.450000	76.516667
4.	GHUMARWIN	31.450000	76.716667
5.	HATWAR	31.583333	76.700000
6.	GEHRWIN	31.366667	76.683333
7.	JHANDUTTA	31.366667	76.650000
8.	BUHAR (KOTIDHAR)	31.316667	76.633333
9.	SWARGHAT	31.225000	76.708333
10.	BBMB FOOTBALL GROUND NANGAL	31.383333	76.366667
11.	NFL GROUND NAYA NANGAL	31.383333	76.366667
12.	LUHNU	31.333333	76.750000
13.	GSSS JUKHALA	31.266667	76.850000
14.	NAMHOL	31.261111	76.865278
15.	BAKLOH	32.488889	75.922222
16.	BANIKHET	32.552778	75.958333
17.	BHARMOUR	32.447222	76.541667
18.	CHAMBA	32.572222	76.119444
19.	CHAURI	32.441667	76.008333
20.	CHHATRU	32.325000	77.383333
21.	KILLAR	33.086111	76.408333

22.	SAACH	33.033333	76.416667
23.	AJOG	32.925000	76.463889
24.	BARSAR	31.533333	76.463889
25.	HAMIRPUR	31.688889	76.541667
26.	NADAUN	31.783889	76.369444
27.	SUJANPURTIHRA	31.831944	76.500278
28.	BIAR	31.569444	76.479167
29.	BARU	31.680556	76.540278
30.	GOVT. COLLEGE GROUND HAMIRPUR	31.702778	76.521389
31.	KANJYAN	31.680556	76.637500
32.	SAMIRPUR	31.721667	76.651389
33.	JUNGALBARI	31.843333	76.531389
34.	NIT HAMIRPUR	31.705833	76.524722
35.	BAIJNATH	32.050000	76.633333
36.	DHARAMSALA	32.176389	76.307778
37.	GAGAL	32.175000	76.272222
38.	JAISINGPUR	31.908333	76.605556
39.	NURPUR	32.183333	75.900000
40.	PALAMPUR (AR)	32.116667	76.563889
41.	PALAMPUR (UN)	32.102778	76.558333
42.	PONG DAM	32.016667	75.902778
43.	REHAN	32.169444	75.913889
44.	SAPRI	31.897222	76.308333
45.	YEOL	32.163889	76.372222
46.	DHARAMSHALA ARY GROUND	32.250000	76.166667
47.	DHALIARA	31.856944	76.193611
48.	SHAHID BHUVNESH DOGRA GROUND DEHRA	31.866667	76.212778
49.	GIABUNG	31.775000	78.441667
50.	CHOLLING (NEAR KARCHHAM ARMY)	31.583333	78.083333
51.	KARCHAM	31.516667	78.172222
52.	POOH	31.758333	78.588889
53.	RAKCHHAM	31.383333	78.380556
54.	RECKONG PEO	31.891667	78.286111
55.	SANGLA (JP IND)	31.430556	78.241944
56.	SUMDO	32.058333	78.605556
57.	KUPPA	31.441944	78.245278
58.	ROPA	31.790278	78.449167
59.	JANGI	31.608333	78.433333
60.	LARJI	31.716667	77.216667
61.	MANALI	32.250000	77.183333
62.	NAGAR	32.119444	77.152778
63.	PALCHAN	32.310000	77.189444
64.	BARING	32.655556	76.850000
65.	CHHOTA DARA	32.266667	77.516667
66.	JISPA	32.642778	77.189444

67.	KAZA	32.216667	78.080556
68.	RUKLING	31.604167	78.438056
69.	SAGNAM	32.034722	78.058333
70.	SISSU	32.480556	77.118056
71.	STINGRI	32.569444	77.077778
72.	TABO	32.097222	78.383333
73.	TANDI	32.538889	76.980556
74.	TINDI	32.750000	76.466667
75.	TINGRIT	32.850000	76.786111
76.	UDAIPUR	32.711111	76.666667
77.	JUNJAIL	31.522222	77.222222
78.	KARSOG	31.391667	77.227778
79.	MANDI	31.711111	76.938889
80.	PANDOH	31.673056	77.055556
81.	PRASHAR LAKE	31.758333	78.000000
82.	SARKAGHAT	31.681667	76.729444
83.	SUDHAR	31.933333	76.983333
84.	SUNDERNAGAR	31.519444	76.888889
85.	KANGU	31.441667	76.858333
86.	THACHI	31.680556	77.211111
87.	BATAIL	31.584722	76.740556
88.	DHARAMPUR MANDI	31.805556	76.762500
89.	KAW KARSOG	31.356667	77.231111
90.	BASA	31.583333	77.333333
91.	SHIKARI DEVI	31.483333	77.166667
92.	JOGINDERNAGAR (DOHAG)	31.997222	76.762778
93.	GOVT. POLY. TECH. COLLEGE GROUND SUNDERNAGER	31.250000	76.897222
94.	GSSS KARSOG (MUMAIL)	31.383333	77.202778
95.	ANNADALE	31.119444	77.163889
96.	CHOPAL	30.958333	77.588889
97.	DODRAKAWAR	31.208333	78.088889
98.	DEHA (SHIMLA)	31.466667	77.450000
99.	JHAKHARI	31.505556	77.719722
100.	JUBBAL	31.116667	77.663889
101.	KALYANI (RETREAT)	31.138889	77.300000
102.	KANDA	31.566667	77.163889
103.	KUMARSAIN	31.325000	77.452778
104.	RAMPUR	31.466667	77.636111
105.	ROHRU	31.216667	77.752778
106.	SARAHAN	31.511111	77.797222
107.	THEOG	31.133333	77.041667
108.	THARU NANKHARI	31.333333	77.550000
109.	SEONI	31.255556	77.133333
110.	AMBOTA	30.777778	77.688889
111.	RAJGARH	30.833333	77.302778

112.	HARIPURDHAR	30.766667	77.533333
113.	KAFOTA	30.625000	77.700000
114.	KALA AMB	30.530556	77.202778
115.	NAHAN	30.569444	77.291667
116.	PAONTA SAHIB	30.438889	77.627778
117.	SANGRAH (AT JAUGADHDHAO)	30.697222	77.444444
118.	SARAHAN (SIRMOUR)	30.716667	77.200000
119.	SHILAI	30.683333	77.700000
120.	TRILOKPURI	30.594444	77.517778
121.	BARU SAHIB	30.758333	77.300000
122.	DNKNAR	30.716667	77.288889
123.	HALHAN	30.733333	77.638889
124.	SHALANA RAJGARH	30.841667	77.300000
125.	RENUKA	30.608611	77.449722
126.	BAROTIWALA (SCHOOL GROUND)	30.933333	76.816667
127.	DAGSHAI	30.866667	77.083333
128.	NALAGARH	31.041667	76.716667
129.	NAUNI	31.866667	77.172222
130.	SANAWR	30.908333	77.000000
131.	SOLAN(ARMY)	30.916667	77.100000
132.	BOHAR	31.319444	76.636111
133.	M/S JINDAL MECTECH PVT AS LANDING GROUND NALAGARH	31.500000	76.716667
134.	CHAIL	30.963056	77.211111
135.	BADIDHAR, 2KM AWAY FROM BATAL CHOWK	32.500000	76.950000
136.	SHALAGHAT (KOTLI)	31.211111	76.983333
137.	MARKET COMMITTEE DHALLI (PARWANOO)	30.838889	76.988889
138.	GSSS DHARAMPUR GROUND	30.966667	76.816667
139.	GOVT. COLLEGE GROUND NALAGARH	31.033333	76.750000
140.	GROUND OF UHF NAUNI	30.866667	77.166667
141.	SANGNAI(AMBOTA) UNA	31.705000	76.342222
142.	UNA	31.472222	76.266667
143.	DULEHAR	31.341944	76.212778
144.	KANGAR	31.443611	76.209444
145.	SNGNAI	31.702778	76.044444
146.	THANAKALAN	31.580556	76.347222
147.	KHAD PLAY GROUND	31.526667	77.502778
148.	POLICE LINES JHALEHRA	31.488333	76.244722
149.	GOVT. SS SCHOOL SALOH	31.477778	76.200000
150.	GOVT. ELEMENTARY SCHOOL GROUND CHURURU	31.606111	76.158611
151.	AMB GONDPUR BENERA	31.748333	76.033889
152.	MANDALI	31.526111	76.359444

Source: General Administration Department, Himachal Pradesh

3.9 Ensuring Public private partnership

SDMA will enter into agreement with major project developers to support preparedness, relief, recovery, rehabilitation and reconstruction initiatives of the Govt. Major Power projects are located at strategic locations and would help in providing vital data for early warning for hydro meteorological disasters. Availability of necessary infrastructure with them would help in mounting immediate response in the event of any disaster.. Basin wise inventory of resources available with projects will be provided to SEOC & DEOC's. Regular meetings once in three months will be held involving Project authorities, DDMA & NGOs and VDRTs to assess the coordination and readiness of resources. It will be mandatory for the project authorities to present their disaster management plans to DDMA

3.10 Improving Techno legal Regime

Considering the high vulnerability of the State to seismic hazard the plan recognizes the importance of putting in place codes for safe earthquake constructions. The structural mitigation measures being critical to minimizing the impact of earthquake, the SDMA will issue necessary directions to Department Of Towns Country Planning to revise the existing building bye laws and Act by incorporating the necessary amendments. An expert group will be constituted by the Town & Country Department which will meet every six-month to review the various construction codes and laws being practiced in the State of Himachal Pradesh. This group shall also review the codes by taking into consideration the HVRA that will be ready by the end of the year 2013. The expert group shall also prepare safe construction guidelines for rural areas and review all regulations to identify gaps from seismic, flood and landslide hazard perspective. The building bye laws shall also provide for safety aspects to be taken up in all new constructions and in upgrading the strength of existing structurally vulnerable constructions. The expert group shall bring out and highlight constrain of using different construction material and shall also bring out simple guidelines with earthquake tips by focusing on to three aspects viz. **design, construction and building material.**

3.11 Development of Hazard Vulnerability Risk scenario of the State

Knowledge on the magnitude of various hazards and associated risk is adequate for macro level understanding but the existing database on HVRA is not only incomplete but incomprehensive as well for detailed planning at District and Block level. In order to fill this gap the Govt. has commissioned a study through a consultant to prepare an Atlas of Hazard Vulnerability Risk Assessment at Block level. This study is designed to provide generic basic data, undertake analysis, and quantify disaster risk levels and associated causal factors. The study will also propose solutions for reducing the hazard risks. Future plans will be developed by taking into consideration the outcome of this study. The vulnerability and Risk Atlas envisaged to be generated as part of this exercise will contain series of GIS data based maps at State, District & Block level providing insight to hazard exposure, vulnerability and cumulative multi hazard loss geographic region wise.

3.12 Implementation of Insurance Schemes

The state Govt. has introduced the insurance scheme since 1999-2000 for major crops such as wheat Barley, Maize, Paddy and Potato. 50% subsidy on premium is being provided to small and medium farmers of the state. The scheme is compulsory for the loaner farmers and optional for the non loaner farmers. The scheme provides comprehensive risks insurance against drought, hail storm floods, pests and disease etc. Ginger crop of Sirmour and Tomato crop of Solan and Sadar block of Bilaspur, Rabi potato crop of Kangra and Una districts have also been covered under Weather Based Crop Insurance Scheme(WBCIS) on pilot basis. Similarly WBCIS is being implemented for 15 blocks in respect of Apple crop and 9 blocks in respect of Mango crop covering dominant fruit growing areas of the state.

3.13 Mitigation and Prevention Plan

State Disaster Management Authority Objectives

For efficient execution of the State Disaster Management Plan, the Plan has been organized as per the following four stages of the Disaster Cycle.



3.13.1 Mitigation Plan

The primary objective of mitigation efforts would be:

- To identify, delineate and assess the existing and potential risks and to work towards reducing potential casualties and damage from disasters.
- To substantially increase public awareness of disaster risk to ensure safer environment for communities to live and work.
- To reduce the risks of loss of life, infrastructure, economic costs, and destruction that result from disasters.

In view of the prevailing risk and the vulnerabilities perception, the mitigation measures proposed have been categorized under following six major groups:

1. Risk assessment

2. Construction work
3. Repair and maintenance
4. Research and technology transfer
5. Training and capacity building
6. Land Use Planning and Regulations
7. Resources for Mitigation

Since vulnerability & Risks varies from area to area and so is the capacity & capability to respond hence mitigation plan has been evolved by taking into considered local specificities. Mitigation strategies also envisage higher level of community involvement and participation.

In rural areas, characterized by inadequate infrastructure and poverty groups, all mitigation efforts will be backed up by a strong and committed programme of social development for the communities. Constant re-examination, of development policies and programmes, leading to equity and social justice, will be ensured for the successful implementation of mitigation efforts that are being proposed.

The role of training, education, and information dissemination will constitute the key intervention for ensuring the implementation and sustainability of the mitigation strategies.

The SEC with inputs from the state technical committee(s) will plan and coordinate all the mitigation activities at the state level. All the concerned departments will develop and implement their respective mitigation plans. The departments nodal officers will coordinate the mitigation activities and apprise the SEC about also be responsible for communicating the status of the department's efforts formation time.

3.13.2 Components of Mitigation Plan:

Risk Assessment and Vulnerability Analysis

- Improve understanding of the locations, potential impacts, and linkages between hazards, vulnerability, and measures needed to protect life safety and health.
- Provide updated information about hazards, vulnerabilities, and mitigation processes to state and local agencies.

The department of Environment and Scientific technologies will be the prime department responsible for upgrading risk assessment and vulnerability analysis at state and district level. Special focus will be given to areas highly vulnerable to disasters triggered by climate change. The department will engage the local bodies, NGOs and local community in order to develop a realistic ground based assessments by working with Panchayat and the Zila Parishads, the District Disaster Management Authority will periodically hold meetings to review local vulnerabilities or any symptoms of early warning indicative of potential disaster. The HVRA Atlas that is being prepared through a consultant will be ready by the year 2013. Aryabhata Geo-Informatics Centre of Department of EST will update and disseminate the HVRA in consultation with SDMA & SEC.

Construction work

Building bylaws

The techno-legal regime in the state recognizes the vulnerability of the State to natural disasters and the potential of strong laws in controlling detrimental developmental activities that can undermine the safety of people. Earthquake resistant features have been incorporated in the building by-laws of the State, which will be revised from time to time. Adequate zoning laws such flood plain regulation etc will be put in place to regulate development away from unsafe locations.

Infrastructure and Housing Repair and Maintenance

- Transportation

- Roads and Bridges
- Provision of special corridors for Fire Brigade, Ambulances, and Police
- Housing
- Retrofitting and renovation of lifeline buildings

Lifeline buildings represent critical infrastructure for the state, such as schools and hospitals. The Public works department will be the primary agency responsible for conducting structural assessment, retrofitting and renovation of lifeline buildings. Existing development programmes will be examined to incorporate disaster resistant technologies in all existing and new public buildings. Similarly in order to reduce the potential risk to other constructions, strengthening of micro level protection features will be identified and taken on priority in areas with recurrent threat of floods, and other water related disasters along major drainage basins in the state

Maintenance

All the departments will ensure that mitigation measures are incorporated into repairs, major alterations, new development, and redevelopment practices, especially in areas subject to substantial risk from hazards.

For the rural areas, the Rural Development Department will ensure that mitigation measures are incorporated in all its rural development programmes such as NREGA & MNREGA.

Undertaking regular safety audit of structures such as check dams and water storage tanks constructed as part of development programmes for ensuring the safety of people from potential threat.

For the urban areas, the Urban Development Department will coordinate with the district authorities to ensure that mitigation measures are included in all development programmes.

Research and Technology Transfer

The departments of Environment and Scientific Technologies and Public works & Housing Boards and Town & Country Planning will be the primary agencies responsible for-

- Research, develop, and promote adoption of cost-effective building and development laws, regulations, and ordinances exceeding the minimum levels needed for life safety.
- Establish and maintain partnerships between all levels of government, the private sector, community groups, and institutions of higher learning that improve and implement methods to protect life and property.
- Report on changes in hazards, agency progress toward achieving mitigation goals ongoing projects, and new opportunities arising through advancements in technology, knowledge, or completed work.
- Identify and interact with research institutions to evolve mitigation strategies.
- Identify, recognize and incorporate, after suitable scientific validation, community based traditional coping capacities against natural disasters.

3.13.3 Training and Capacity Building:

Training and Capacity Building of Government Officials

At the state level disaster management will be added as a topic for all induction & foundation courses to be conducted by HIPA and all other training institutes in the state.

At the district level, training programmes will be conducted in coordination with NGOs, and government training/research institutions.

Community Level Training and Public Awareness Activities

The community awareness and training activities will basically be carried out in the form of training programmes through NGOs, Private Sector, and Government Training Institutions. Apart from spreading awareness of disasters, the focus will essentially be on community capacity building.

Special focus will be given to local contractors and masons, who are solely responsible for construction work. Training programmes will target the informal construction sector by building their capacities on safe construction practices and retrofitting of existing structures. An institutional long-term arrangement through technical institutions will be put in place for up gradating the skills of contractors and masons for ensuring safe construction practices.

Primary agencies for community level training and public awareness are:

- Himachal Institute of Public Administration
- Environment, Science and Technology Department
- Technical Education Department
- NGO
- Private sectors

The NGOs, private sector organizations and other government training institutions will, in turn, organise training and simulation exercises at the district and community level, for ensuring preparedness at the grass-roots.

Mobilizing Community Efforts for Mitigation Measures

The community will be encouraged to reduce the impact of the next disaster. Demonstration modal housing units indicating various technology features and options will be built by the Government/NGOs/Community. Priority will be given for buildings like Panchayat, primary health centres, community centre, schools etc.

The objective of such activity will be to encourage local communities to undertake and adopt appropriate measures at individual, household or community level to avoid loss of life, damage to property and crop.

Land Use Planning and Regulations

The department of Town and Country planning will be the primary agency to encourage new development to occur in locations avoiding or minimizing exposure to hazards or enhance design requirements to improve resiliency in future disasters. This department would also ensure proper enforcement of existing regulations and Acts and revision of existing laws.

Incentives and Resources for Mitigation

It is proposed to create a State Disaster Mitigation Fund to implement the above stated mitigation strategy. The fund will be used to provide incentives to developmental projects where mitigation measures have been adopted. Leveraging of funds from other developmental schemes also needs to be taken into account. The State Disaster Management Authority will be the authority in-charge of the State Disaster Mitigation Fund.

3.13.4 Culture of Prevention

For holistic and safe development, the involvement of institutions like Panchayati Raj, Urban Local Bodies and the NGOs in a coordinated effort is desirable. Through an organised mechanism all departments shall propagate and endeavour to create.

- Culture of Preparedness
- Culture of Quick Response
- Culture of Strategic Thinking
- Culture of Prevention

Following Initiatives will be taken:

- Plans will be prepared at all levels
- Plan updating week will be observed in the last week of **April** every year.
- Plan Rehearsal Week will be observed in the first week of **May** every year.
- Participation of all concerned, especially the NGOs and community based organizations will be ensured in this state-wide exercise.

Effective Trigger Mechanism

The Trigger Mechanism concept envisaged as an “emergency quick response mechanism” which, when activated prior to or during a disaster simultaneously sets into motion required prevention and mitigation measures with minimum loss of time. Operation of Trigger Mechanism with clear delineation of duties & functions including identification of key personnel has been put in place as effective mitigation strategy. Adequate delegation of authorities has been assured to act in the first critical 24-28 hours without loss of time in planning or seeking clearance/approval/direction from superiors. Standard Operating Procedures (SOPs) have been evolved with meticulous details for effective operation of the Trigger Mechanism.

Culture of Strategic Thinking

- Networking of Knowledge-based institutions and learning exercise would be taken up on priority.
- Use of Traditional and local Knowledge will be embedded in the village level plans through Village Disaster Management Committee (VDMC).
- Advanced scientific & technological information will be used for warning and alert purpose.
- The Aryabhata Centre of Geo-informatics would be responsible for creating GIS based data base and net-working with all institution with in the state and at national level.
- Introduction of micro-credit and micro insurance at village level will be taken on priority.

3.13.5 Hazard Specific Mitigation Plan

I. Action Plan for Earthquake Mitigation

- i. Revision and adoption of model building bye-laws for construction both in urban and rural area.
- ii. Wide dissemination of earthquake-resistant building codes, the National Building Code 2005, and other safety codes.
- iii. Training of trainers in professional and technical institutions such as HIPA and NIT
- iv. Training professionals like engineers, architects, and masons in earthquake resistant construction.
- v. Launching demonstration projects to disseminate earthquake-resistant techniques.
- vi. Launching public awareness campaigns on seismic safety risk reduction and by sensitizing all stakeholders to earthquake mitigation measures.
- vii. Establishing appropriate mechanisms for compliance review of all construction designs submitted to ULBs.
- viii. Undertaking mandatory technical audits of structural designs of major projects by the competent authorities.
- ix. Developing an inventory of the existing built environment.
- x. Assessing the seismic risk and vulnerability of the existing built environment by carrying out structural safety audits of all critical lifeline structures.

- xi. Developing seismic strengthening and retrofitting standards and guidelines for existing critical lifeline structures.
- xii. Undertaking seismic strengthening and retrofitting of critical lifeline structures, initially as pilot projects and then extending the exercise to the other structures.
- xiii. Preparation of DM plans by schools, hospitals, public buildings visited by large number of people etc., and carrying out mock drills for enhancing preparedness.
- xiv. Strengthening the EOC network and flow of information.
- xv. Streamlining the mobilization of communities, civil society partners, the corporate sector and other stakeholders.
- xvi. Preparing community and village level DM plans, with specific reference to management of earthquakes.
- xvii. Carrying out the vulnerability assessment of earthquake-prone areas and creating an inventory of resources for effective response.
- xviii. Introducing earthquake safety education in schools, colleges and universities and conducting mock drills in these institutions.
- xix. Strengthening earthquake safety research and development in professional technical institutions.
- xx. Preparing documentation on lessons learnt from previous earthquakes and their wide dissemination.
- xxi. Developing an appropriate mechanism for licensing and certification of professionals in earthquake-resistant construction techniques by collaborating with professional bodies.
- xxii. Developing appropriate risk transfer instruments by collaborating with insurance companies and financial institutions.
- xxiii. Making operational the local companies of Home Guards and Police for disaster response.
- xxiv. Strengthening the medical preparedness for effective earthquake response, etc.
- xxv. Enforcement and monitoring of compliance of earthquake-resistant building codes, town planning bye-laws and other safety regulations.

II. Land Slide Mitigation

- i. Revision of town planning bye-laws and adoption of model land use bye-laws in the State.
- ii. Wide dissemination of model land use practices in hilly areas.
- iii. Training of trainers in professional and technical institutions.
- iv. Training of professionals like engineers and geologists for landslide mapping, investigation techniques, analysis, and observational practices.
- v. Launching public awareness campaigns on landslide hazard and risk reduction, and sensitizing all stakeholders on landslide hazard mitigation.
- vi. Establishing appropriate mechanisms for compliance reviews of all land use bye-laws.
- vii. Preparing an inventory of existing landslides, active or inactive, in the State.
- viii. Developing an inventory of the existing built environment in areas around existing landslides and in high hazard zones as per the LHZ maps and along strategic roads.
- ix. Assessing the status of risk and vulnerability of the existing built environment.

- x. Preparation of DM plans by educational and health institutes/organizations, government offices, etc., and carrying out mock drills for enhancing preparedness in vulnerable areas.
- xi. Strengthening the EOC and communication network.
- xii. Streamlining the mobilization of communities, government agencies, the corporate sector, and other stakeholders.
- xiii. Preparing community and village level DM plans, with specific reference to the management of landslides.

III. Management of Drought

The salient features of mitigation plan will be:

- i. A Drought Management Cell (DMC) will be established in the Agriculture Department.
- ii. Drought management plan for the entire season will be prepared by the Agriculture Department well in advance in the month of May, based on the long season forecast issued by IMD in April and also the previous season's rain fall.
- iii. Drought management plans will be prepared block wise.
- iv. As the season progresses from June onwards, the DMC will review the plans prepared earlier at the onset of the monsoon and revise the strategy if required.
- v. Weekly monitoring of the season and crop condition from June onwards till the end of the season and make necessary midseason corrections as and when required.
- vi. Agriculture Department will make use of remote sensing and GIS technology while providing the inputs to the SDMA & DDMA.
- vii. A sound database will be created and updated regularly on weather, crop conditions, input supply, credit, insurance and market information, fodder supply etc. in order to assist the DDMA for Drought declaration and Management.
- viii. Awareness will be brought among the farmers on drought regulations and enforcement.
- ix. The techniques of rain water harvesting technology will be popularized on priority.

IV. Managing Chemical, Biological, Radiological and Nuclear Emergencies – Contamination of Water Supply.

To manage an incident of CBRN contamination of water supply, a modal SOP as given under will be followed.

Incident Reporting

Any breach of security or suspected event of accidental or intentional contamination will be communicated to the Executive Engineers or any other function of IPH Department officer of the water facility through quickest possible means. Subsequently, he will inform the same to local police, law enforcement and intelligence agencies, and request for physical quarantine of the contamination site. The incident would also be reported to Secretary Deptt. of Home, SEC, SDMA with request to remain at stand by.

Site Characterization

Water supply in charge along with law enforcement agencies would visit the site and make on site inspection for identification of physical evidences to confirm the incident. Police & Law enforcement agencies would collect and preserve physical evidences for further investigation and necessary action.

Water facility in charge will also make an initial hazard assessment based on available evidences for determining potential need for specialized men, material, techniques or equipment. Based on the findings of initial site evaluation, both to and fro water supply should be stopped immediately.

Preliminary Screening

Specifically Trained personnel of IPH department would be deployed for sample collection and spot-testing. Sample would be collected from the nearest point. Sample collected would be divided into two, one for spot testing and another for laboratory testing. First set would be subjected to spot testing by prescribed methods. Once the incident and nature of contamination is established the same would be communicated to district administration in precise and clear language for activating their crisis management plan. Following positive screening, second half of the sample would be immediately sent to pre identified reference laboratories in consultation with SDMA/NDMA.

Risk Communication

District administration in association with disaster management authority will make public pronouncement of contamination event in clear and precise language along with requisite precautions to be taken. All care will be taken to avoid undue panic situation.

Alternate Supply

The concerned Executive Engineer in association with district administration would make alternate supply arrangements. In absence of alternate supply, water would be decontaminated through the technique of reverse osmosis and mobile water purification van developed by DRDO for which contact will be established with NDMA.

Decontamination

Supply lines and storage facilities would be decontaminated using appropriate and available technology such as Reverse Osmosis, Carbon Columns and other Water Purification System (WPS) suitable for purification of water contaminated by CBRN agents. State Pollution Board shall advise on this issue.

Restoration of supply

Following repair and decontamination of facility, a fresh water sample would be retested and certified for public consumption.

V. Psycho-Social Care and Mental Health Support (PSSMHS)

Following measures will be taken:

- i. Department of Social Welfare & Child Development will set up counseling centers.
- ii. Integrating with DM mental health plans and Health/Hospital DM Plans.
- iii. Integrating with all training in the area of Psychology, Social Work, Mental Health, Emergency Medical Response, Hospital Administration, Nursing and Paramedics.
- iv. Inclusion in the CBDM Plan and training of PRI team members.
- v. Developing awareness material for the community.
- vi. Evolve a mechanism for community outreach education programmes on PSSMHS.
- vii. Creation of a core group of master trainers at district level.

Chapter IV - Mainstreaming Concerns into Developmental Plans / Programmes / Projects

Mainstreaming disaster management into the development planning process essentially means looking critically at each activity that is being 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.

Every development plan in the state would require incorporating elements of impact assessment, risk reduction, and adoption the 'do no harm' approach. The measures such as urban planning and zoning, upgradation of building codes their enforcement, adoption of disaster resilient housing designs and flood proofing, response preparedness planning, insurance, establishment of early warning systems generating community awareness, creating technical competence and promoting research among engineers, architects, health experts will be taken on priority.

4.1 Inclusion of Disaster Risk Reduction (DRR) in Development Planning

The current level of urbanization is likely to increase. Urbanization is inevitable and growing at a fast pace, urban settlements are bound to be confronted with problems of greater magnitude in terms of shelter options, cramped living spaces, problems of transportation, access to facilities, services etc and above all the climate change, mainstreaming Disaster Risk Reduction (DRR) issues in Development Plans etc are to be interlinked vertically and horizontally for fail safe infrastructures in Himachal Pradesh.

The Major challenges which will be addressed are as follows:

4.1.1 Technical:

- Micro-zonation
- Risk Identification & Assessment
- Vulnerability Assessment
- Identification and optimum utilisation of local resources.
- Monitoring the DMP plans of all Projects
- Community disaster risk reduction of all NREGA & MNREGA based programmes
- Integration of development plans with Disaster Management Plan

4.1.2 Regulatory:

- Development of Law
- Up-gradation of Building Bylaws
- Building Inspection and compliance of BIS
- Retrofitting methodologies
- Soil Improvement measures
- Compulsory Disaster Risk assessment as part of project planning
- Geotechnical investigations of all road projects
- Mandatory geological & geotechnical examination of all engineering programmes

4.1.3 Organizational:

Achieving Greater Integration between State, District, Block & Panchayat level governance through:

- Sensitizing professionals and people about DRR issues. Sensitization community and NGOs towards disaster mitigation and projecting DRR as a new challenge for all ULBs and PRIs.

- Creating an enabling environment through capacity building of stakeholders,
- Use of information on hazard potential, incorporating earthquake resistant features in buildings and infrastructure and undertaking flood and landslide control measures, Integrating disaster vulnerability into land-use planning,
- Implementing regulatory measures in industrial zones such as Land use plans, zonal development and layout plans
- Facilitating setting up of Disaster Management Cells in Industrial belts through Industrial Associations
- Coordination and sharing of knowledge and information amongst all stakeholders
- Improving emergency response planning process by making available increased resources to integrate risk mitigation into urban planning and city management, Generating preparedness and emergency management capacity at all levels.
- Manage and enhance the capacity of ULBs for
 - Minimization the hazard risks
 - Establishing institutional framework
- Facilitating structural and non-structural interventions

4.1.4 Disaster Risk Reduction Initiatives:

1. Mapping hazard prone areas at block level in respect of earthquake, floods, landslides, avalanches, drought, flash flood and all other man made & environmental hazards
2. Assigning appropriate land uses with low intensity of development
3. Devising appropriate zoning regulation.
4. Implementation and enforcement of zoning regulations and building bye laws
5. Vulnerability Assessment of buildings
6. Categorization of Buildings having high/ very high risk
7. Feasibility study for retrofitting of residential and lifeline buildings
8. Preparing a Framework for Re Development
9. Adoption of villages and communities by private project proponents for disaster preparedness and capacity building.

4.2 The Legal Context

The DM Act mandated the DDMA to “lay down guidelines to be followed by the departments of the Government of the State for the purposes of integration of measures for prevention of disasters and mitigation in their development plans and projects and provide necessary technical assistance therefore” and to “review the development plans of the different departments of the State and ensure that prevention and mitigation measures are integrated therein”. Under Section 38 (2) (e) of the Act the State Government is to ensure that the integration of measures for prevention of disaster or mitigation have been incorporated by the departments of the Government of the State in their development plans and projects. The State Government is further to ensure integration of measures to reduce or mitigate the vulnerability of different parts of the State to different disasters in the state development plan {38 (2) (f)}.

4.2.1 The Act also prescribes for preparation of District Plan and for incorporation of measures suggesting as to how mitigation shall be integrated into development plans and projects. The Act states that the DMPs shall prescribe “the manner in which the mitigation measures shall be integrated with the development plans and projects”. The DMPs of departments at State and district level shall also have provisions for prevention of disaster and mitigation of its effects or both in the development plans and programmes as provided for in the State DMP and as is assigned to the department or agency concerned.

4.3 Mainstreaming DRR into Development

4.3.1 Mainstreaming has three purposes:

- To make certain that all the development programmes and projects that originate from or funded by Government are designated with evident consideration for potential disaster risks to resist hazard impact.
- To make certain that all the development programmes and projects that originate from or are funded by Government do not inadvertently increase vulnerability to disaster in all sectors: social, physical, economic and environment.
- To make certain that all the disaster relief and rehabilitation programmes and projects that originate or are funded by Government are designed to contribute to development aims and to reduce future disaster risk.

4.3.2 Mainstreaming DRR into Development Sectors:

DRR refers to the measures used to reduce direct, indirect and intangible disaster losses. The measures may be technical, economic or social. DRR encompasses the two aspects of a disaster reduction strategy: 'mitigation' and 'preparedness'. Mitigation refers to measures aimed at reducing the risk, impact or effects of a disaster or threatening disaster situation, whereas, preparedness refers to the measures undertaken to ensure the readiness and ability of a society to forecast and take precautionary measures in advance of imminent threat, and respond and cope with the effects of a disaster by organising and delivering timely and effective rescue, relief and other post-disaster assistance. 'Mainstreaming DRR' describes a process to fully incorporate the concerns of disaster preparedness, prevention and mitigation into development and post disaster recovery policy and practice. It means completely institutionalizing DRR within the development and recovery agenda. Accordingly, the following broad objectives of mainstreaming DRR into Development will be encouraged:

- Ongoing schemes and projects of the Ministries and Departments of Gol and State Governments, as well as of all Government agencies and Institutions, including Public Sector Undertakings, will be selectively audited by designated government agencies for ensuring that they have addressed the disaster risk and vulnerability profiles of the local areas where such schemes and activities are being undertaken.
- At conceptualization or funding stage itself, the development schemes will be designed with consideration of any potential hazardous impact associated with it and incorporate measures for mitigation of the same.
- All the development schemes will be pragmatic, incorporating the awareness of local disaster risk and vulnerability, and ensuring that the schemes have addressed these concerns and included specific provisions for mitigating such disaster concerns; and
- DDMA will ensure that all the disaster relief and recovery programmes and projects that originate from or are funded by any agency satisfy developmental aims and reduce future disaster risks.

4.4 Approaches for mainstreaming

4.4.1 There are three suggested approaches of mainstreaming disaster management into the development process and disaster management plans-

1. Structural Measures
2. Non Structural Measures
3. Disaster Mitigation Projects

4.4.2 Based on the suggested approaches the specific action would involve:-

- a. Adopting a Sectoral approach and identification of Key sectors for mainstreaming.
- b. Within each sector, key programmes/projects would have to be identified.
- c. This has to be followed by indentifying the entry points within the programmes/projects for integration.

- d. It would also involve work at the policy and planning level be it national, state and district level.
- e. It would also need a close coordination with State Planning Commission and Finance Department for promoting DRR into all development programmes and involve working with different departments to mainstream DRR into the Departmental Plans and policies.
- f. Advocacy would have to be done for allocation of dedicated budget for DRR within the departmental plans.
- g. Further appropriate guidelines for different sectors would have to be development and for it to be effective and sustainable, it has DRR would have to be ultimately integrated to the development plans of various departments at the district and sub-district levels.

4.5 Illustrations of Mainstreaming DRR into ongoing Flagship Programmes

Some of the following flagship programmes for Government of India could be used as an entry point for mainstreaming the DRR in development plans and the following steps may be undertaken:

Table 4.1 Mainstreaming DRR into ongoing Flagship Programmes

Sr. No.	Name of the Programme	Department / Sector	Proposed Strategies for DRR Integration into the Flagship Programmes
1.	Indira Awas Yojana	Rural Development	<ol style="list-style-type: none"> i. Inclusion of such measures like application of Hazard resistant design in construction of IAY houses, appropriate sitting of IAY housing in guideline of IAY ii. Development of model design for IAY houses which could be easily referred to by DRDAs at district level and used for community awareness depending on the geographical location. iii. Capacity Building of Rural masons on safe construction. iv. Capacity Building of PRIs. v. Community Awareness. vi. Capacity Building Programmes for DRDA officials on Disaster Risk Reduction issues.
2.	Mahatma Gandhi National Employment Guarantee scheme	Rural Development	<ol style="list-style-type: none"> i. Utilisation of MGNREGS funds to reduce the vulnerability of Panchayat vis a vis natural hazards such as landslide, drought, forest fire, cloud burst, flash floods, earthquake etc. ii. Giving priority to those works which reduce the vulnerability of area over the works which enhances the vulnerability of the area to natural hazards. iii. Identified works are available which take into account the hazard profile and offer continuous employment opportunities in the event of disasters to ensure livelihood security in the event of disasters. iv. Works which reduce disaster risk are given priority in plans-such as local mitigation works etc. v. Any other implement able suggestion within the ambit of the scheme.
3.	Pradhan Mantri Gram Sadak Yojana	PWD	<ol style="list-style-type: none"> i. The Master Plan for rural roads, the district rural road plan and identification of core network under the planning process of this scheme should, which the overall guidelines of its preparation, explicitly address the disaster risk reduction concerns and accord priority to connect the vulnerable habitations. ii. The technical guidelines should explicitly provide for suitable protection and inclusion of disaster risk

			<p>concerns explicitly - while provision of cross drainage, slope stabilization, protection works are already included, in multi-hazard and especially flood and landslide prone areas fair weather roads need to be upgraded on a priority basis.</p> <p>iii. The maintenance guidelines are modified to ensure that in case of disasters these roads get provision for restoration to ensure all weather connectivity.</p>
4.	Sarva Siksha Abhiyaan	Education	<p>i. Development of a Policy paper of school safety.</p> <p>ii. Introducing school safety as a part of the guidelines of SSA which is currently focusing on inclusive development.</p> <p>iii. Developing model structurally safe designs for schools.</p> <p>iv. Introducing School Safety in the Teacher's Training Curriculum.</p> <p>v. Training of Rural Engineers appointed under SSA Scheme as well as the SSA State Coordinators.</p> <p>vi. Training of masons in rural areas.</p> <p>vii. Construction of Technology Demonstration Units.</p> <p>viii. Community Awareness.</p>
5.	Jawahar Lal Nehru Urban Renewal Mission	Urban Development	<p>i. Strengthening of the compliance mechanism at the detail project report submission and appraisal stage in case of infrastructure projects as well as housing scheme to ensure structural safety.</p> <p>ii. Emphasis on disaster risk audit at the stage of preparation of detail project reports.</p> <p>iii. Inclusion of amending of building byelaws to ensure structural safety as a mandatory reform in the Mission cities to ensure safe habitat development.(Both structural safety and fire safety norms).</p> <p>iv. Inclusion of disaster management as a function of the Urban Local Bodies and allocate resources.</p> <p>v. Inclusion of Disaster Resistant features in the houses being constructed under the BSUP component as well as promote development of safe habitat.</p> <p>vi. Inclusion of strategies for disaster management in the City Development Plans.</p> <p>vii. Training and Capacity Building Programmes for municipal officers on disaster risk reduction.</p>
6.	Rajiv Awas Yojana	Urban Development	<p>i. Since Rajiv Awas Yojana is focusing on developing slum free cities and Capacity Building and Community Mobilization is also an important component of RAY, through this programme attempts can be made towards community level disaster preparedness as slum dwellers often become the most vulnerable community during such disasters as floods, fire and high wind speed. The 30 cities selected on a plot basis can be targeted to initiate community based disaster preparedness activities.</p> <p>ii. Also the Housing Programmes to be implemented in these selected cities can ensure incorporation of hazard resistant features and safe sitting.</p>
7.	National Rural Health Mission	Health and family welfare	<p>i. Ensure that the village Health Plan and the District health plan explicitly address the disaster risk reduction concerns in the vulnerable habitations and the vulnerable districts and the disaster management plan as per DM Act 2005 takes links itself to the District and village Health plans.</p>

			<ul style="list-style-type: none"> ii. Provide training to the ASHA workers on disaster health preparedness and response. iii. Strengthening of Disease Health Surveillance System in rural areas. iv. Ensuring structural safety of the CHC/PHC and other health care service delivery centers in rural areas. v. Training of doctors and hospital staffs on mass casualty management and emergency medicine. vi. Community awareness on disaster management.
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The list given in the above table is an indicative one and many more line departments can be added to it. DRR planning needs to be done at Municipal and Panchayat levels with the involvement of local community representatives; and simultaneously the resource and responsibility to manage would be in the domain of the local authorities. Decentralized planning can enhance local participation along with improved efficiency and equitable benefits.

4.6 Mainstreaming DRR into Development Planning- Approaches

Disasters are basically unresolved problem of development. Development can increase vulnerability. Development can reduce vulnerability. The outcome rests on developmental choices. The seeds of disasters are often sown in development patterns: poor land use planning, environmental management and lack of regulatory mechanisms. It is due to this reason that despite having almost similar exposures disaster has greater impact on humans in developing or low developed countries than the developed countries. Therefore, disaster risk can best be addressed through integrating into the developmental planning, programmes and processes.

The mapping of hazards, identification of elements at risk and exposure data assists in quantifying risk. Thereafter risk reduction initiatives can be taken. Mainstreaming DRR is a prerequisite for safe and sustainable development. Some of the key sectors where integration of DRR can be done are as follows:

a) Public Infrastructure:

- i) Incorporate disaster risk impact assessment as a part of the planning process before the construction starts.
- ii) Site analysis and risk sensitive land-use planning (either avoid development in hazard prone areas or adopt treatment and mitigation measures)
- iii) Strengthen compliance to the various provisions of the codes – set up hazard safety cell for advice and monitoring
- iv) Disaster resistant technologies mandatory in case of all construction using public/corporate funds.
- v) Training and capacity building of the department and functionaries.

b) Housing – Rural and Urban:

- i) Application of hazard resistant designs
- ii) Prepare construction guidelines for rural areas, Nagar Panchayats and Municipal Councils.
- iii) Amendment of Building bye-laws, Zoning regulations and Development Control Regulations.
- iv) Strengthening the enforcement of techno-legal and managerial regime.
- v) Training of masons, engineers, architects, contractors, promoter and builders.

- vi) Sensitization of the banking and financial institutions.
- vii) Promotion of disaster insurance in housing sector.
- viii) Having a housing reconstruction policy.

c) Health Sector:

- i) Ensure hospitals and health facilities are not located in hazard-prone areas.
- ii) Analyze the internal and external vulnerabilities of existing health care facilities during emergencies.
- iii) Retrofitting of the critical hospitals.
- iv) Prepare and implement hospital preparedness plan.
- v) Training of doctors on mass casualty management, trauma care and emergency medicine.
- vi) Training of health workers on emergency preparedness and response.
- vii) Strengthening of disease surveillance system.

d) MGNREGS – Scope of work – Some illustrations:

- i) Water conservation and water harvesting;
- ii) Drought proofing, including forestation and tree plantation;
- iii) Irrigation canals, including micro and minor irrigation works;
- iv) Plantation and horticulture;
- v) Renovation of traditional water bodies, including de-silting of tanks;
- vi) Land development;
- vii) Flood-control and protection works, including drainage in water logged areas; and
- viii) Rural connectivity to provide all weather access.

e) Indira Awas Yojna:

- i) Study IAY housing typology and develop hazard resistant model design (taking into consideration of available local materials and culture).
- ii) Training of DRDA officials and engineers.
- iii) Awareness generation among villagers and PRIs members and community mobilization campaign.
- iv) Construction of sample IAY units for promoting the technology.
- v) Training of Masons and community members on hazard resistant technology.

Chapter V - Preparedness Measures

5.1 Capacity Development

The SEC will ensure that all concerned departments implement their respective preparedness / contingency plans encompassing the following:

- Micro-Hazard zonation for each hazard.
- Display of warning boards for general public in sensitive area.
- Inventory of human and material resources available with Government, Private and Civil Society.
- Training, Capacity Building of the State Search and Rescue Task Forces
- Training, Capacity Building of the State First Aid Task Forces
- Training and capacity building of Civil police, Fire Brigades, NCC, CBOs.
- Medical Preparedness- nominate/ designate hospitals, doctors and paramedics to cover emergency health management.
- State, District, Block & Village level mock drills and rehearsals.
- Public Awareness generation and community evacuation training.
- Community based disaster management (CBDM).
- Ensure that GP, Block and Districts develop and maintain its disaster management plans.
- Inventory of Lifeline buildings such as of schools, hospitals, administration buildings and assess their safety and take measures for improving safety.
- Knowledge management
- Budgetary allocations
- Yearly- Updating of the state plan. In case of a disaster the plan will be reviewed right after that.

5.1.1 Community and local level preparedness:

The plan recognises the fact that in the event of disaster communities are the first responders and hence there is no better alternative to community and local level capacities for disaster response. In order to enhance communities' capacity to take action to help themselves in the absence of necessary outside response for days the plan envisages creating necessary awareness about hazards, risks and response. Areas which would be specifically addressed for community preparedness are-

- i) Medical first aid
- ii) Search and rescue extrication from damaged buildings
- iii) Road clearance
- iv) Fire fighting

Plan also envisages equipping community at Panchayat level by ensuring the provision of medical supply, communication such as radio, TVs, extrication equipment. Panchayat will be encouraged to establish local early warning systems in higher vulnerable areas and for holding community level disaster response drills. Development of response capacity at Panchayat level for first response would help in avoiding desperate situation. Creation of Sub-division level stock pile for relief and warehouses would be ensured.

5.1.2 Sustainable Development Practices and Climate Change:

Disasters have also negative impacts on environment as they affect natural resources. Therefore, considering society, economy and environment as three main components of sustainable development, disasters have negative impacts on them and hence negative impact and delay on sustainable development.

Sustainable development and use of new technologies will be a must in the implementation of this plan. Priority would be given for promoting understanding of climate change adaptation strategies, energy efficiency and natural conservation.

5.1.3 Hazard Safety Cell:

Building Safety Cells (BSC) headed by SE (Designs) will be established at the State headquarters of PWD and in all district headquarters. The Public Works Department will reorganise their design cells for dissemination of information to public for proper implementation of the building codes in all future constructions, and to ensure the safety of buildings and structures from various hazards. The BSC will also be responsible for carrying out appropriate design review of all Government buildings to be constructed in the State, act as an advisory cell to the State Government on the different aspects of building safety against hazards and as a consultant to the SDMA for retrofitting of the lifeline buildings. The cell shall also undertake safety evaluation of engineering structures.

5.1.4 State Disaster Response Force (SDRF):

State would create response capabilities from within their existing resources. In the first phase the police department would be equipping and training one battalion equivalent police force including women members for looking after the needs of women and children. NDRF battalions and their training institutions will be used for capacity development. The Police department has included DM training in-service courses for officers and HIPA is organising refresher courses.

Department of Home in Consultation with SDMA shall be primarily responsible for taking preparedness measures and building response capacity as per their vulnerability to various natural disasters and constitute State Disaster Response Forces on the pattern of NDRF.

5.1.4.1 Training and Equipping of SDRF:

Training and equipping of Search & Rescue Teams of SDRFs will be undertaken by the Department of Home in consultation with the NDMA and MHA. Each SAR team will be trained for search, rescue and evacuation in collapsed structure and medical first aid response. Some SAR teams will also be trained and equipped for deep-water rescue, slithering and industrial accidents. The Teams will also have dog squads.

Besides the SAR teams, the Police, Home Guards, Fire and Forest protection force will also be imparted general training in search and rescue at the time of induction and as a part of refresher training. This will cover all gazetted officers and subordinate officers.

5.1.5 Fire and Emergency Services:

The Fire Services in the States will be strengthened and made multi-hazard response outfit. These will be appropriately equipped depending upon their location and the disasters they will be tackling.

5.1.6 Home Guard and Civil Defence:

Home Guard and Civil Defence volunteers will be enrolled for voluntary services in accordance with the provisions of the Civil Defence Act. The services of HMCD volunteers would be utilized during response to disasters.

5.1.7 Armed Forces/NDRF:

Being a border and mountainous state the role of Army is very critical in responding to emergency situations in remote and inaccessible pockets. Even though Armed Forces would be deployed only when the situation is beyond the coping capacity of State Government and local Administration yet the requirement of Army support would be crucial at time of emergencies. In order to streamline the

interface for resource sharing coordination meeting will be held with Army & Paramilitary units located in Himachal every six months through SEC.

5.1.8 Role of National Cadet Corps (NCC), National Service Scheme (NSS) and Nehru Yuva Kendra Sangathan (NYKS):

Potential of these youth based organisations will be optimised to support all community based initiatives and DM training would be included in their programmes. Special training campaign will be launched to strengthen their capacities.

5.1.9 Pre-Contract for Essential Commodities:

The Department of Food & civil supplies will ensure storage and availability of essential commodities including medicine in the vulnerable districts. Necessary provisions will be made for, to enter pre-contract with the suppliers of essential commodities, medicines, tents etc. on an annual basis for supply of these items at pre-decided rates within stipulated time framework.

5.2 Medical Preparedness

Identification of the hospitals, doctors and para-medics teams including mental health and psycho-social service provider at sub-divisional and district levels will be carried out by CMO's in a manner that the teams are in a position to be deployed at short notice. Their names, addresses, telephone numbers, mobile numbers, email etc. will be available at the State District Emergency Operation Centres. The list will be updated half yearly. The stock of medicines, accessories and equipment for each of identified teams at the district and sub-divisions would be decided in advance as per need and disaster.

5.2.1 Animal Care:

Animals both domestic as well as wild are exposed to the effects of natural and man-made disasters. The department of Animal & Husbandry would devise appropriate measures to protect animals and find means to shelter and feed them during disasters and their aftermath, through a community effort, to the extent possible. It is pertinent to note that many communities have shown compassion to animals during disasters, and these efforts need to be formalized in the preparedness plans including Carcass Disposal Management Plan by the Departments of Animal Husbandry at the State level.

5.3 Social Inclusion

5.3.1 Needs of Special Vulnerable Groups:

When addressing the preparedness and relief requirements of the disaster victims, focus would be placed on the special needs of the vulnerable population that is, children, women, aged and the disabled. Socio-cultural needs would be accounted for in all phases of disaster management planning. A specific strategy for addressing the risk reduction needs of these vulnerable groups will be developed by every line department. Representation of department of Social Justice and Empowerment has been made in the specified committees constituted under HPSDMA to ensure that issues related to special vulnerable groups is taken care of under different phases of the state disaster management planning.

5.4 Mock Drills

Search and Rescue Teams at State Levels will carry out mock drills on various disasters situation annually. For floods/flash floods these will be carried before the monsoon period. For earthquakes, landslides etc., such drills will be done in the month of April/ May itself. At the district and State

levels, mock exercises will be carried out for assessing and evaluating preparedness machinery including manpower and equipment.

5.5 Observing April 4th as Earthquake Preparedness Day

On April 4, 1905 a major earthquake devastated the Kangra region of the state when 20,000 people died and enormous loss of life & property took place. In order to get prepared to deal with such eventualities in future State wide Mass Mock drill will be carried by everyone to assess their preparedness on April 4 every year.

5.6 Observance of October 13th as International Disaster Reduction Day

United Nations has declared October 13th as the International Day of Disaster Reduction (IDDR) to be celebrated every year. This day would be celebrated by all the departments and institutions to assess level of preparedness, create mass awareness and conduct mock drill in their respective institutions and departments.

Chapter VI - Response Plan

Providing initial response in the event of sudden disaster is not only difficult but challenging as well. Normally when a crisis situation develops the picture is often unclear and chaotic and would become further complicated when disaster happens during night time or during winter season and collapse of communication & transport network takes place. The first reaction is to act spontaneously.

Traditionally and conventionally the district administration headed by Deputy Commissioner provides government first organised response to any disaster calamity or crisis. However community provide the first humanitarian response. Immediate response to any disaster is to launch rescue operations aimed at saving human lives animal's lives and property in order of priority. The rescue operations are to be carried out over a short period of time ranging from few hours to few days. During this period depending upon intensity, mobilisation of all possible resources is to be done. As the rescue operation is on, the process of providing relief such as food, clothing, shelter, security, first aid, sanitation etc. also starts and this phase may last for few days.

6.1 Response

Immediate on receiving information about the disaster that strikes any area the trigger mechanism is activated either from 'TOP' or from the 'BOTTOM' depending upon the situations the following actions will be initiated:

- Generation of event scenario report to be sent as per the trigger mechanism.
- Preparation of current status on life line facilities and infrastructure.
- Rapid visual assessment of damage to buildings.
- Assessment of Casualities.
- Assessment of number of displaced persons.
- Assessment of Transport requirements
- Assessment of requirement of shelters
- Assessment of basic need requirement of displaced persons.
- Status of search and rescue operations.
- Details and listing of missing persons.
- Assessment of type & extent of medical support for undertaking emergency operation.
- Status of identification of stakeholders and role players for providing supporting response and recovery operations.
- Status of activating call center for providing multiple pieces of information to callers and relatives of victims.

Primary tasks during this phase would be:

- a) Proper need assessment through village response
- b) Deployment of resources to all affected sections in an equitable manner
- c) Besides food, cloth and shelter facilities such as public health and sanitation is to be provided in shelters or camps.
- d) Ensuring total transparency in distribution of relief material
- e) Putting in place an objective method of assessing damage

6.1.1 Role of Specialised agencies:

- Civil defence organisations which are available at the district level will be involved in organising relief & rescue operations especially in 59 urban localities in the State.
- Network of the civil defence will be expanded in most vulnerable pockets within towns and cities.

- Recognising the fact that police are among the first responders in any crisis all police stations in the State would be further trained for ensuring effective response rescue in the wake of disaster or crisis situation. As first responder police normally communicate information and mount rescue and relief operation with whatever rescue available at their disposal.
- Specific rescue teams will be constituted at State, District and Sub Division level to serve as an auxiliary to Police & Fire teams. Home guards will also assist the police in maintaining law and order.

6.1.2 Armed Forces / Territorial / Ex-Servicemen:

Himachal Pradesh having international border with Tibet and located close to Pakistan border is having the presence of large Army spread throughout the State Assistance and support of highly trained dedicated and well equipped human resources will be utilised in the crisis situation by DDMA and SDMA.

6.1.3 State EOC:

Getting early warning and alerts are critical to mount timely and appropriate response. The unified SEOC located in the HP Secretariat will handle information related to disaster management. The state EOC would provide necessary information and coordination to all nodal departments and ESF. The SEOC with robust communication system will be handled by concerned nodal departments by deploying their specialist at the time of crisis.

6.1.4 Sequence of Action at the State Level:

SEOC-

On receipt of information either from NEOC from DEOC or from early warning agencies at national or state level or from any other reliable source the following action will be taken:

- i) SEOC shall bring the information to the notice of SEC
- ii) Issue alerts / warnings to all DDMA's / Nodal Departments ESF and all other designated Departments in the State.
- iii) Through public information directorate release the information for public through AIR, television and Press.
- iv) Establish contact and provide status report to NEOC, MHA
- v) Collect collate and synthesise information for consideration of SEC & SDMA
- vi) Provide regular appraisal and status reports to all designated authorities in the State.
- vii) Arrange meetings of SEC
- viii) Activate ESF's if situation warrants.

6.1.5 State Disaster Management Authority (SDMA):

- i. Meeting of SDMA shall be convened on the direction of chairperson.
- ii. SDMA will take stock of the situation
- iii. SDMA shall assess level of disaster and outside assistance and cooperation required.

6.1.6 State Executive Committee (SEC):

- i. Pr- Secy. Department of Revenue shall convene the meeting of SEC
- ii. SEC shall assess the situation and level of disaster
- iii. Based on the assessments SEC shall give directions for handling the situation and measures to be taken by role players in response to any specific situation or disaster.
- iv. SEC shall review and coordinate response from all departments.
- v. SEC shall call for NDRF, ARMY, AIRFORCE or any other outside support warranted for handling the situation.

- vi. SEC may depute team for on the spot situation assessment and need assessment.
- vii. Sec shall mobilise resources and dispatch them to concerned districts.
- viii. SEC shall review the situation regularly as per demand of the situation.
- ix. SEC shall maintain close liaison and contact with NDMA/MHA and keep them abreast of the situation.
- x. SEC shall constantly evaluate their own capabilities to handle the situation and project the anticipated requirements central resources.
- xi. SEC will take necessary steps to pool the resources for better management of crisis situation.

Role of Key Departments:

- i) At the time disaster and on activation of State ESF plan all the departments shall deploy nodal officers to SEOC for coordination measures.
- ii) All concerned departments shall coordinate with their national counterparts and mobilise specialist resources and assistance as per requirement.
- iii) All departments and organisation of the state shall place the resources at the disposal of DDMA's during disaster situation.

6.1.7 District Emergency Operation Centre (DEOC):

District Emergency Operation Centre located in the office of deputy commissioner shall discharge the following functions:

- On receipt of information from SEOC/SEC or from any field office or Panchayat or from any other reliable source, DEOC will bring this in the notice of DDMA.
- DEOC shall issue necessary alerts to all authorities in the district or at state level depending on the situation.
- DEOC will send regular status and appraisal reports to SEOC.
- DEOC shall maintain all records.
- DEOC shall collate and synthesise information for consideration of DDMA.

6.1.8 District Disaster Management Authority:

- DDMA shall assess the situation and give directions to the concerned department heads in the district for better handling of the situation.
- DDMA shall assess the situation by taking into consideration reports from all formal and informal sources and decide upon the level of the disaster.
- Issue necessary direction for handling the response, relief & restoration measures.
- Call for outside support if necessary
- Keep the SDMA /SEC informed about the situation
- Raise demands for support and assistance
- Assess the resource availability and issue necessary direction for pooling resources for speeding an effective response.
- Process requests for NDRF/Army or any other specialised help.
- Coordinate with Power projects developers NGS's, civil society for supplementing the efforts of Govt.
- Monitoring and reviewing the situation on a regular basis.

6.1.9 First Response:

In disaster situation when disaster is sudden and no early warning signals are available community members and specially the village disaster response team comprising the Panchayat Pradhan, Panchayat Secretary and village Patwari & ward members shall be the first responder. The other first

responder include the police from nearest police station, fire and medical services, civil defence, NCC, NSS, NYKS and Ex-servicemen volunteers available in each village.

First information report:

- District Emergency Operation Centre shall prepare and send first information report to SEOC/summarising the following :
- Severity of the disaster
- Action being taken
- District resources available and coping capacity.
- Need assessment for relief along with quantities.
- Logistics for delivering relief.
- Assessment on future development including new risks.
- FIR should be sent within 24 hours of occurrence of calamity as per the standard format.

Daily Situation Report:

Daily situation report is to be submitted by DEOC for the consideration of DDMA/SDMA/SEC. The report is to be submitted in a standardized form. SOEC shall submit similar report to NDMA/MHA.

Air dropping of food in inaccessible areas:

DDMA/SDMA/SEC shall decide about air dropping of essential commodities in cut off and inaccessible pockets. SEC through GAD will liaise with AIR Force or Govt. Of India for requisition the helicopters. HPTDC units in the state shall prepare food packets for airdropping as per the advice of DDMA.

Rapid Damage Assessment:

Teams of officials drawn from various sector and with the support of local Tehsildar shall make first hand ground assessment of the damage & loss for deciding upon the rescue & relief operations. Preliminary report should be available within 24 hours of the calamity.

Proformas for FIR, Daily situation report and Damage assessment are placed at Annexure to Annexure II- V.

Immediate restoration basic facilities & repair of infrastructure:

HPSEB & IPH Department will ensure the restoration and repair for providing electricity and drinking water. IT department through BSNL and other concerned agency shall ensure the communication for smooth operation of rescue and relief works.

Disposal of dead bodies:

District hospital, Police and District administration and forest department shall facilitate the disposal of bodies in event of mass casualties. The process of identification and handing over to next of kin shall be followed. Mass burial/disposal of bodies shall be the last resort. The bodies shall be disposed in hon'ble manner by observing religious and cultural practices in the area. NDMA guidelines in this direction would be followed. Brief guidelines are at Annexure – VI.

Disposal of Carcasses:

Department of Animal Husbandry in association with the local administration shall be responsible for disposal of carcasses in the event of mass destruction. (As per the procedure in Annexure - VII).

Information & Media Management:

Department Of Public Information in consultation with SEC/DDMA shall be responsible for dissemination of information to electronic and print media. Press briefing shall only be given by a person authorised by DDMA/SEC

6.2 Institutional Mechanism

The State Government has adopted the Disaster Management Act 2005 as enacted by the Govt. of India for providing effective mechanism for Disaster Management in the State of Himachal Pradesh.

6.2.1 State Disaster Management Authority:

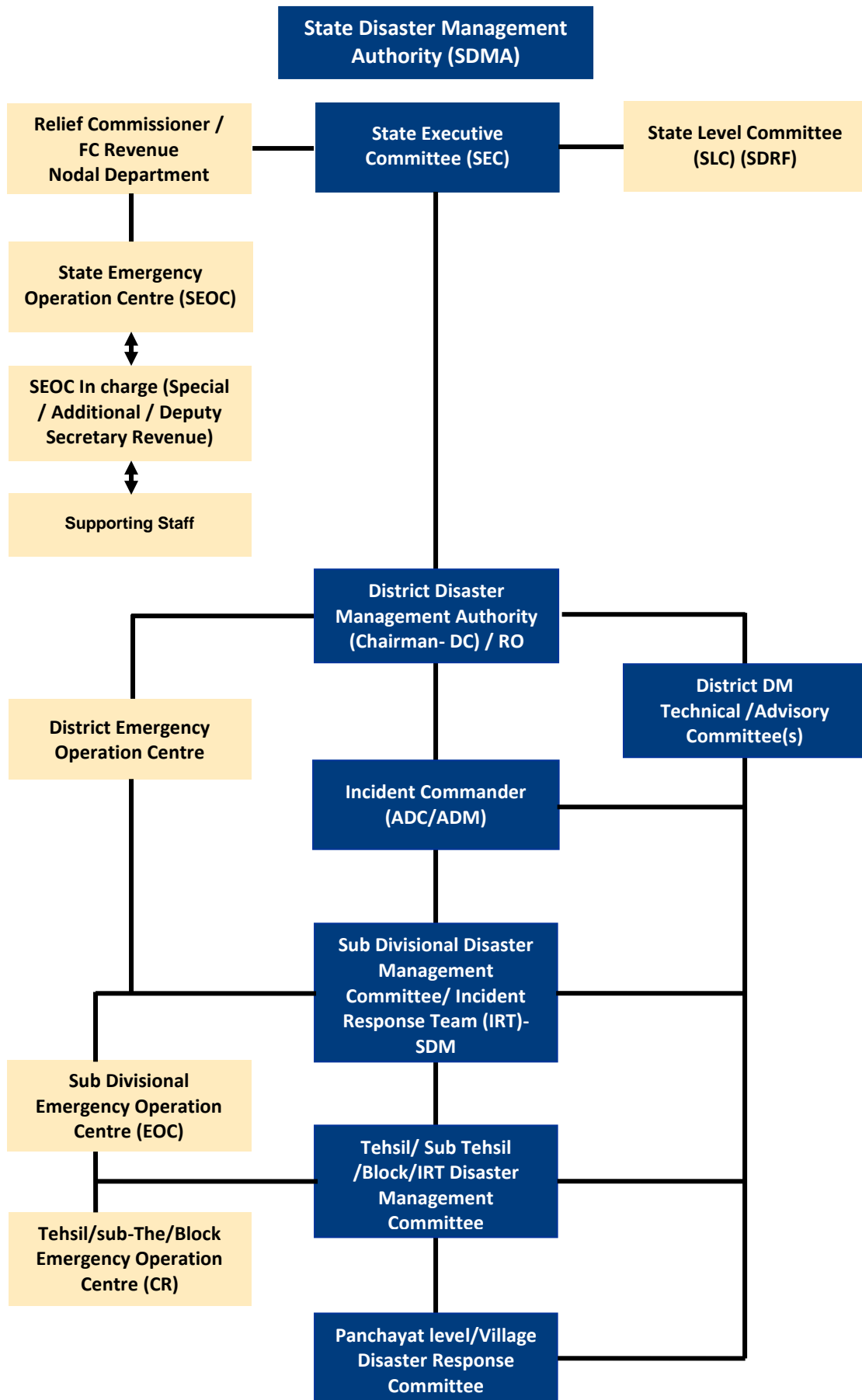
As per clause b of sub-section (2) of Section 14 of the Disaster Management Act 2005, the Himachal Pradesh Disaster Management Authority under the chairperson of the Honourable Chief minister was constituted on 1st June 2007 with the following persons as member of the HPDMA:

1. Honourable Chief Minister	Chairperson
2. Hon'ble Revenue Minister	Member
3. Chief Secretary	Chief Executive Officer
4. Principal Secy.(Rev)	Member
5. Principal Secy. (Home)	Member
6. Principal Secy. (PWD)	Member
7. Principal Secy. (Health)	Member
8. Director General Police	Member
9. Secretary/Add. Secy. (Rev.)	Member Secy.

The State Disaster Management Authority (SDMA) has the mandate to lay down the state policies and approval of State Disaster Management Plan, with the assistance of SEC.

Roles and Responsibilities:

1. Lay down the State disaster management policy
2. Approve the State Plan in accordance with the guidelines laid down by the National Authority.
3. Lay down guidelines to be followed by the departments of the State Government for the purpose of coordination and integration measures for prevention of disasters and mitigation in their development plans and projects and provide necessary technical assistance.
4. Coordinate the implementation of State Plan at State and District level.
5. Recommend provision of funds for mitigation and preparedness measures.
6. Review the development plans of different departments of the State and ensure that prevention and mitigation measures like earthquake resistance structures are built at least for life line structures.
7. Review the measures being taken for mitigation, capacity building and preparedness by the departments of the State Government and issue such guidelines as may be necessary.



6.2.2 The State Executive Committee (SEC):

As per sub-section (1) of section 20 of the Disaster Management Act 2005, the State Executive Committee under the chairperson of Chief Secretary was constituted by the Government of Himachal Pradesh on 1st June 2007 comprising the following members:

S.No.	Officials	Designation
1	Chief Secretary	Chairman
2	Additional Chief Secretary/ PS (Forest)	Member
3	Principal Secretary Revenue)	Member
4	Principal Secretary (Home)	Member
5	Principal Secretary (Health)	Member
6	Principal Secretary (PWD)	Member
7	Principal Secretary (Finance)	Member
8	Principal Secretary (I&PH)	Member
9	Secretary(GAD)	Member
10	Director, HIPA, Fairlawns, Shimla-12	Member
11	Secretary/ Add. Secy.(Revenue)	Member Secretary

As per the Disaster Management Act 2005, the SEC may discharge following functions:

1. Coordinate and monitor the implementation of the National Policy, the National Plan and State plan.
2. Examine the vulnerability of different parts of the State to different forms of disasters and specify measures to be taken for their prevention or mitigation.
3. Preparation of State Disaster Management Plans.
4. Monitor the implementation of State Disaster Management Plan (SDMP) and Crisis Management Plan (CMP) prepared by the line departments of the State Government and District Authorities.
5. Monitor the implementation of the guidelines laid down by the State Authority for integrating the measures for prevention of disasters and mitigation by the departments in their development plans and projects.
6. Evaluate preparedness at all government or non-governmental levels to responds to any threatening disaster situation or disaster and give directions, where necessary, for enhancing such preparedness.
7. Coordinate response in the event of any threatening disaster situation or disaster;
8. Give directions to line Departments of the government of the state or any other authority or body in the State regarding actions to be taken in response to any threatening disaster situation;
9. Promote general education, awareness and community training and to conduct regular Mock drills to test the plan in regard to the forms of disasters to which different parts of the State are vulnerable and the measures that may be taken by such community to prevent the disaster, mitigate and respond to such disaster;
10. Advise, assist and coordinate the activities of the Departments of the Government of the State, District Authorities statutory bodies and other governmental and non-governmental organizations engaged in disaster management.;
11. Provide necessary technical assistance or give advice to District Authorities and local authorities for carrying out their functions effectively;
12. Advise the State Government regarding all financial matters in relation to disaster management.

6.2.3 Technical Committee(s):

Under sub-section (1) of Section 21 of the Disaster Management Act, 2005, the SEC has constituted a sub-committee to look into the issue of amendment to the TCP Act and building bye-laws of Urban Local Bodies.

6.2.4 The State Emergency Operations Centre:

The State Emergency Operations Centre (SEOC) will be a hub of all activities related to disaster response in the State.

6.2.5 District Disaster Management Authority:

The District Disaster Management Authority (DDMA) will act as the district planning; coordinating and monitoring body in accordance with the guidelines laid down by the State Authority.

As per Section 25 of the DM Act 05, DDMA for every district in the State of Himachal Pradesh has also been constituted, consisting of the following members:

S.No.	Officials	Designation
1.	Deputy Commissioner	Chairperson
2.	Superintendent of Police	Member
3.	Chief Medical Officer	Member
4.	Superintending engineer (PWD)	Member
5.	Superintending Engineer (I & PH)	Member
6.	Superintending Engineer (MPP & P)	Member
7.	Chairperson of the Zila Parishad	Member

6.2.6 District Disaster Management Advisory Committee(s):

District level Disaster Management Advisory Committee(s) will be appointed by the District Disaster Management Authority to take advice on various subject specific fields within the overall context of disaster management. The committee will comprise disaster management experts, which may be from government departments, research institutes and NGO's.

6.2.7 District Emergency Operation Centres:

The District Emergency Operation Centres will be the hub of all the activities related to disaster response in the District. It will coordinate and communicate upward and down ward with regard to emergency response.

6.2.8 Tehsil/sub Tehsil/Block Disaster Management Committee:

Subject to the directions of the District Authority, the Tehsil/Sub Tehsil/block disaster management committee will be responsible for the development and implementation of block level disaster management plans.

6.2.9 Gram Panchayat/Village Disaster Response Committee:

Response committees will be constituted to be the first responders under the Chairpersonship of Panchayat Pradhan. The secretary of Panchayat will be secretary of the committee and local Patwaris and ward members shall be its members.

6.3 Trigger Mechanism

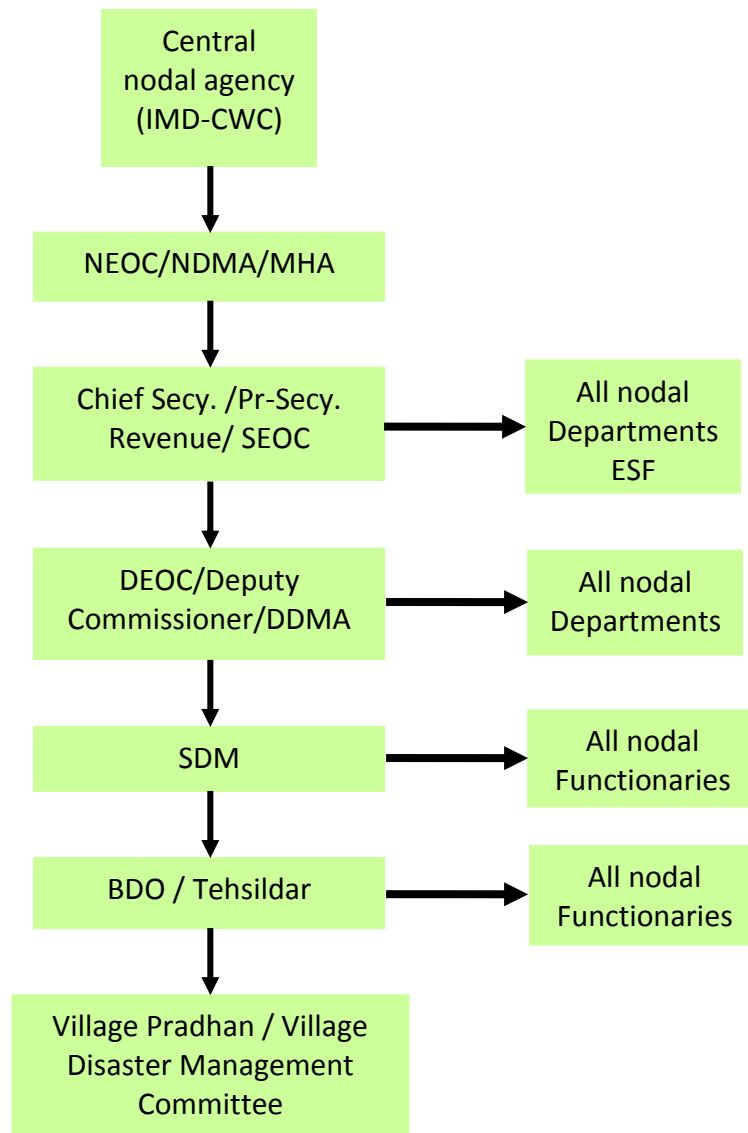
Trigger mechanism is necessary for ensuring unambiguous suo-motto activation mechanism. It is envisaged that in the event of disaster the response system shall be activated automatically to set in motion command, control and management of situation.

Trigger mechanism is devised to deal with two situations that may arise in the disaster event.

When warning signals are available:

- a) In certain situation early warning signals and symptoms are available before the onset of disasters. For such disaster a national level institution has been identified who has been entrusted with the task of carrying out regular monitoring and research. These agencies indicate the onset of disaster through forecasting and communicate the same to NEOC / NDMA/ MHA
- b) Based on the forecast issued by nodal NEOC/NDMA/MHA issue, watch,, alert and warning to SEOC/SDMA/SEC/DEOC/DDMA
- c) On receiving watch, alert warning the SEOC/SEC activates the state and district response mechanism to deal with the situation effectively.
- d) DDMA through its mechanism shall inform the community of the impending threat through warning system and undertake evacuation.
- e) Warnings shall be issued at state & district level through department of public relations and through authorised person only.
- f) Depending on situation dissemination shall be carried out through alarms, sirens, radio, television, loud speakers, hoisting of flags.
- g) Subsequent to warning people shall be kept informed about the status and shall be issued the warning at appropriate situation.
- h) Warning messages shall be composed with caution and care so as not to create undesirable impact and understood easily by the recipients.
- i) DDMA shall issue comprehensive standing order elaborating all necessary pre-emptive measures based on warning.
- j) Periodic evacuation drills shall be carried out in most vulnerable pockets such as perpetual flood prone pockets before the onset of monsoon.

The information flow when warning signals available shall be as follows:

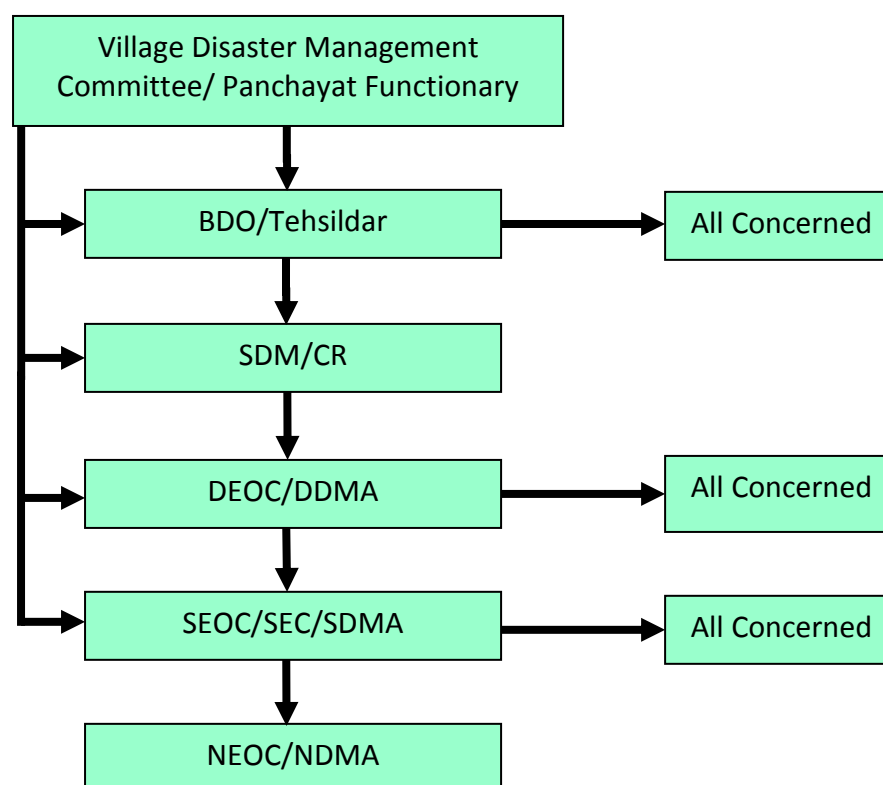


When Disaster occurs without early warning:

- a) When disaster takes place all of sudden without a warning the guiding principal shall be to mount immediate rescue and relief operations
- b) The village response team or any other functionary at ground zero i.e. village level shall inform the SDM/BDO/DEOC about the incidence
- c) SDM/BDO/DEOC shall apprise the DDMA and immediate mount the rescue & relief with whatever resources at their command.
- d) DDMA shall assess the situation and declare the level of disaster i.e. L0, L1, L2, L3.
- e) DDMA shall identify the support requirement and seek assistance if required.
- f) SEC is activated and NEOC/NDMA/MHA informed.
- g) SEC shall assess the situation and mobilise external resources if required.
- h) DDMA shall constantly assess and review the situation and activate coordination, command and control.
- i) DDMA shall deploy teams for rapid assessment of damage.

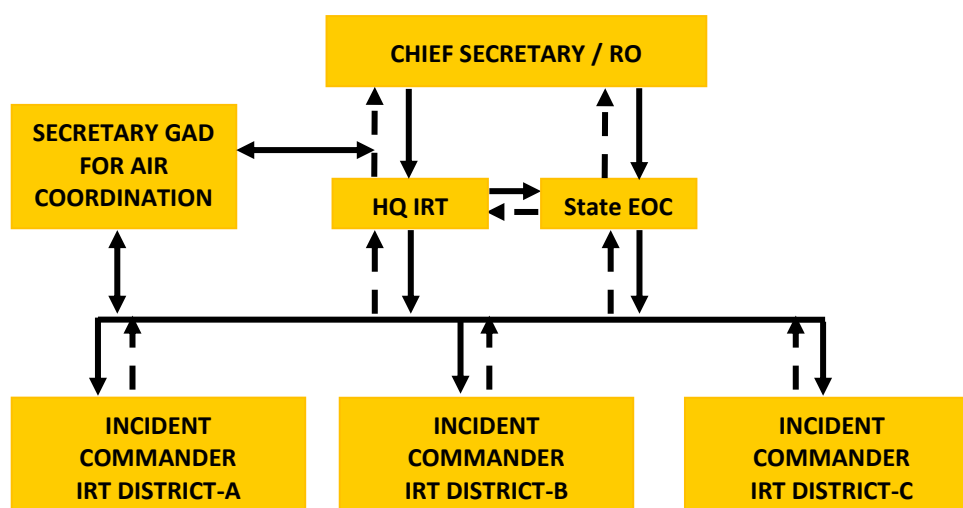
- j) Line department teams shall begin work for restoration of power, water supply telecommunication and road connectivity.

Information flow in situation when early warning is not available shall be as follows:



6.3.1 Trigger Mechanism and Incident Response System (IRS):

The Trigger Mechanism prescribes the manner in which the disaster response system shall be automatically activated after receiving early warning signals of a disaster happening or likely to happen or on receipt of information of an incident. Activities envisaged in the SOPs under the response phase shall be initiated simultaneously without loss of time to minimize the loss and damage and mitigate the impact of disaster.



As per the DM Act, CS is the Chief Executive Officer (CEO) of the SDMA as well as Chairperson of the SEC and Deputy Commissioner is the Chairperson of the DDMA and has been assigned all

encompassing role of planning, coordination and execution of DM in his jurisdiction assisted by all line departments and local bodies. As per the Incidence Response System (IRS) the chief Secretary shall function as RO at the State level and Deputy Commissioner at district level.

6.3.1.1 Roles and Responsibilities of Chief Secretary as RO of the State:

1. The CS who is the head of the State administration and also chairperson of SEC and CEO of SDMA, will perform responsibilities laid down under clause 22 (2) and 24 of the DM Act, 2005;
2. Ensure that IRTs at State, District, Sub-Division, and Tehsil/Block are formed and IRS is integrated in the State and District DM Plan;
3. Ensure that a reasonable amount of interest fund is sanctioned clearly delineating the procedure for emergency procurement;
4. Ensure funds of 13th Finance Commission (FC) for capacity building of administrative machinery in DM is spent appropriately;
5. Ensure that IRS is incorporated in the training syllabus of ATIs and other training institutions of the State;
6. Ensure that effective communication and Web based / online Decision Support System (DSS) is in place in the SEOC and connected with District, Sub-Division, Tehsil/Block level IRTs for support;
7. Ensure that toll free emergency numbers existing in the State for Police, Fire and Medical support and are linked to the EOC for response, command and control;
8. Activate IRTs at State headquarters when the need arises and issue order for their demobilization on completion of response;
9. Set overall objectives and incident related priorities;
10. Identify, mobilize and allocate critical resources according to established priorities;
11. Ensure that local Armed Forces Commanders are involved in the Planning Process and their resources are appropriately dovetailed, if required;
12. Ensure that when NDRF, Armed Forces arrive in support for disaster response, their logistic requirements like, camping ground, potable water, electricity and requirement of vehicles etc. are taken care of;
13. Coordinate with the Central Government for mobilization of Armed Forces, Air support etc. as and when required;
14. Identify suitable nodal officer to coordinate Air Operations and ensure that all District ROS are aware of it;
15. Consider the need for the establishment of AC, if required;
16. Establish Unified Command (UC) if required and get the approval of Chief Minister;
17. Ensure that telephone directory of all ESF is prepared and available with EOC and IRTS;
18. Ensure use of Global Positioning System (GPS) technology in the vehicles (Police, Fire, Ambulance etc.) To get connectivity for their effective utilization ;
19. Keep the chairperson of SDMA informed of the progress of incident response;
20. Ensure that the Non-Governmental Organizations (NGOs) carry out their activities in an equitable and non-discriminatory manner;
21. Conduct post response review on performance of IRTs and take appropriate steps to improve performance; and
22. Take such other necessary action as the situation demands.

6.3.1.2 Coordination of Response at the State Level:

The State Government / CS will designate various officers of line departments for the corresponding IRS positions to perform their duties. Being the administrative head of the State as well as the CEO of SDMA, the CS is designated as the RO of the State. She/he may delegate some of his functions to the Secretary, DM of the State, for the day to day supervision and management of the incident. She/He will however remain fully briefed by SEOC and IC and be aware of all developments and progress of response activities at all times. In case an incident is beyond the control of a District administration or a number of Districts are affected, the RO of the State will consider setting up of an Area Command and designate an Area Commander (AC). He may consider the Divisional Commissioner to act as AC or may deploy appropriate/suitable officer irrespective of seniority. The RO may also deploy some supporting staff to assist him.

6.3.1.3 Roles and Responsibilities of Deputy Commissioner as RO:

1. Ensure that IRTs are formed at District, Sub-Division, Tehsil/Block levels and IRS is integrated in the District DM Plan as per Section 31 of the DM Act, 2005. This will be achieved by issuing a Standing Order by the RO to all SDMs and Tehsildars/ BDOs;
2. Ensure web based / on line Decision Support System (DSS) is in place in DEOC and connected with Sub-Division and Tehsil / Block level IRTs for support;
3. Ensure that toll free emergency numbers existing for Police, Fire and Medical support etc. are linked to the DEOC for response, command and control;
4. Obtain funds from State Government as recommended by the 13th FC and ensure that a training calendar for IRTs of District is prepared and members of IRTs are trained through ATIs and other training institutions of the District;
5. Delegate authorities to the IC;
6. Activate IRTs at District headquarter, Sub-Division, Tehsil / Block levels, as and when required;
7. Appoint / deploy, terminate and demobilize IC and IRT(s) as and when required;
8. Decide overall incident objectives, priorities and ensure that various objectives do not conflict with each other;
9. Ensure that IAP is prepared by the IC and implemented;
10. Remains fully briefed on the IAP and its implementation;
11. Coordinates all response activities;
12. Give directions for the release and use of resources available with any department of the Government, Local Authority, private sector etc. in the District;
13. Ensure that local Armed Forces Commanders are involved in the planning process and their resources are appropriately dovetailed, if required;
14. Ensure that local Armed Forces Commanders are involved in the planning process and their resources are appropriately dovetailed, if required;
15. Appoint a nodal officer at the District level to organize Air Operations in coordination with the State and Central Government NO. Also ensure that all ICs of IRTs of the District are aware of it;
16. Ensure that the NGOs carry out their activities in an equitable and non- discriminatory manner;
17. Deploy the District Headquarter IRTs at the incident site, in case of need;
18. Ensure that effective communications are in place;
19. Ensure that telephone directory of all ESF is prepared and available with EOC and

members of IRTs;

20. Ensure provision for accountability of personnel and a safe operating environment;
21. In case the situation deteriorates; the RO may assume the role of the IC and may seek support from the State level RO;
22. Mobilize experts and consultants in the relevant fields to advise and assist as he may deem necessary;
23. Procure exclusive or preferential use of amenities from any authority or person;
24. Conduct post response review on performance of IRTs and take appropriate steps to improve performance; and
25. Take other necessary action as the situation demands.

6.3.1.4 Area Command (AC):

In the event of disaster involving more than two districts the Commissioner of the respective zone will act as Area Command. Area Command will be activated when span of control becomes very large either because of geographical reasons or because of large number of incidents occurring at different places at the same time. Area Command may also be activated when a number of administrative jurisdictions are affected. AC will facilitate closer supervision, support to the IRTs and resolution of conflicts locally. In such eventualities the District Magistrate (RO) of the District will function as the IC. Similarly the District RO may introduce it Sub-Division wise when a large number of Tehsils / Blocks in different Sub-Divisions get affected. The RO will ensure adequate supporting staff for the AC. The roles and responsibilities of AC are as follows:

- Ensure that incident management objectives are met and do not conflict with each other;
- Allocate critical resources according to identified priorities;
- Ensure proper coordination in the management of incidents;
- Ensure resolution of all conflicts in his jurisdiction;
- Ensures effective communications;
- Identify critical resource needs and liaise with the SEOC for their supply;
- Provide for accountability of personnel and ensure a safe operating environment;
- Perform any other tasks as assigned by the RO.

6.3.1.5 Unified Command (UC):

In an incident involving multiple agencies, there is a critical need for integrating resources into a single operational organization that is managed and supported by one command structure. This is best established through an integrated, multi-disciplinary organization. In the IRS this critical need is addressed by the UC.

UC is a framework headed by the Governor / Administrator / CM and assisted by the CS that allows all agencies with jurisdictional responsibilities for an incident, either geographical or functional, to participate in the management of the incident.

UC will incorporate the following components:

- i. A collective approach for developing strategies to achieve incident goals;
- ii. Improved information flow and inter-agency coordination;
- iii. Familiarity with responsibilities and constraints of other agencies;
- iv. Respect for the authority or legal responsibilities of all agencies;
- v. Optimal synergy of all agencies for the smooth implementation of the IAP; and
- vi. Elimination of duplication of efforts.

6.3.1.6 Roles of Local Authorities PRIs and ULBs:

The DM Act, 2005 has defined the roles of NACs, Municipalities, Municipal Corporations, Municipal Councils and PRIs under section 41 (1) (2). These bodies will ensure that their officials and employees are trained in DM and resources relating to DM are also maintained in order to be readily available for use in any threatening disaster situation. These bodies will carry out relief activities in the affected areas in accordance with State and District DM Plans.

6.3.1.7 Community Participation in Disaster Response (CBDM):

A number of community based organizations like NGOs, Self Help Groups (SHGs), Youth Organizations, Volunteers of NYK, Civil Defence (CD) & Home Guard, etc., and workers of different projects funded by Government of India like National Rural Health Mission (NRHM), Integrated Child Development Services (ICDS), etc., would be required to act as volunteer in the aftermath of any disaster.

In the IRS structure, the skills of these organisations shall be utilised as Single Resource. The ROs of the State and District will ensure that such resources at village, ward or Gram Panchayat levels are organized with the help of leadership of PRIs and other community leaders. Their resources would be identified as per hazard and they would be encouraged and trained to be a part of the IRT. As a part of Plan one NGO for each block as lead NGO shall be identified and whose capacity will be developed to coordinate response for VDRC.

6.3.1.8 Role of Village Disaster Response Committees (VDRC):

The plan envisages constituting village response committees in each Panchayat comprising Panchayat Pradhan, Panchayat Secretary and village Patwari besides ward members. The village committees will constitute response teams from amongst the villagers by taking in to consideration local needs viz-a-viz the hazard and vulnerability assessment. These response teams will be trained as first responders to garner disaster response in the absence of outside emergency responders. The plan envisages covering all 3243 Panchayats over a period of three years using video conference set up of RDD available at HIPA. The capacity building would involve awareness raising (about hazard, risks, disaster response) organising training (medical first aid search & rescue extrication from damaged buildings, road clearance, fire fighting) equipping (first aid kit, radio, extrication equipment) and networking. The plan also envisages establishing and strengthening local warning systems holding community drills through VDRCs. The committee would be responsible for:

- Developing the village Disaster Mitigating Plan
- Keeping contact with Block and District level committees and all other agencies related with the issue.
- Constituting response teams for search& rescue, medical aid, extrication of bodies, fire fighting or for any other purpose as per village specific needs.
- Ensuring house hold preparedness to village specific hazards.
- Identification of safe locations for temporary shelters
- Training and capacity building of all teams
- Resource inventory and gap identification with respect to the needs
- Identification of vulnerable groups

6.4 State Emergency Operations Centre (SEOC)

SEOC is an offsite facility which will be functioning from the HP Secretariat which actually is an augmented control room having communication facilities and space to accommodate the various ESFs emergency supports functions. It will be manned by various line departments of Government and other agencies, whose services are essentially required during incident response. It will allow all agencies and departments to share information, make decisions, activate plans, deploy IRTs, perform and log all necessary response and relief activities and make the EOC effective.

6.4.1 Functioning of SEOC:

- a) Additional Secretary Revenue shall be overall in charge of EOC;
- b) Nodal officers of all concerned line departments will be the member of EOC and will have authority to quickly mobilize their departmental resources;
- c) The SEOC will have communication facilities with connectivity to Block & Village level;
- d) SEOC will be equipped with a vehicle mounted with HF, VHF and satellite telephone for deployment in the affected site to provide immediate connectivity with the headquarters and ICP;
- e) SEOC will have connectivity with NEOC & National & State warning facilities;
- f) It will have well defined provision and plan for dovetailing the NDRF, Armed Forces and communication capabilities with the local communication set up. There will be proper plan so that all are able to connect with each other in case of large scale disasters or failure of the local communication systems;
- g) SEOC will have connectivity with State Aryabhatta Geo-Informatics Centre for data and information.
- h) SEOC will have DM plans of all line departments incorporating the following:
 - Directories with contact details of all emergency services and nodal officers;
 - Connectivity with all District headquarters and police stations;
 - Database of NGOs working in different geographical areas;
 - Demographic details of the State and Districts;
- i) Online / Web based DSS with the availability of at least the following components:
 - Standardization of Command Structure with the details of the earmarked and Trained personnel in IRS;
 - Proactive planning facilities;
 - Comprehensive resource management system;
 - Geographic Information System (GIS) for decision support; and
- j) Socio-economic, demographic and land use data for planning;
- k) Resource inventories of all line departments and connectivity with database of India Disaster Resource Network (IDRN) India Disaster Knowledge Network (IDKN) and Corporate Disaster Resource Network (CDRN);

6.4.2 Incident Response Team (IRT):

The ROs of the State and Districts will constitute IRTs from among officers at the State and District level respectively. The members of IRTs will be properly trained and sensitised regarding their roles during the pre-disaster phase itself. The SEOC & DOEC will provide continuous support to the on-scene IRT(s) and if required join them or take over response on the directions of the RO.

6.4.3 Incident Response System (IRS) Facilities:

For effective response the following facilities will be established depending on the needs of the incidents.

6.4.4 Incident Command Post (ICP):

The ICP is the location at which the primary command functions are performed. The IC will be located at the ICP. There will be only one ICP for each incident. This also applies to situations with multi-agencies or multi jurisdictional incidents operating under a single or Unified command. The ICP

will be located with other incident facilities like Incident Base.

The ICP may be located at Headquarters of various levels of administration and in case of total destruction or non availability of any other space, the ICP will be located in a vehicle, trailer or tent with adequate lighting, effective communication system.

6.4.5 Deployment of IRT:

On receipt of information regarding the impending disaster, the EOC will inform the RO, who in turn will activate the required IRT and mobilize resources. The scale of their deployment will depend on the magnitude of the incident. In the event of occurrence of disaster without warning local IRT (District, Sub-Division, Tehsil / Block/ Village) will respond and inform the higher authority and if required seek reinforcement and guidance.

6.5 Roles and Responsibilities of Nodal Departments/ Agencies

H.P. Disaster Management Authority (HPDMA)	Lay down policies and plans for disaster management in the State. Declare emergency situation in case of State level disaster and the end of it. Provide policy directions and integration of Disaster Management programmes in the state development framework.
State Executive Committee for Disaster Management (SEC)	Implementation of the State Plan and monitoring body for management of disasters in the State.
Himachal Institute of Public Administration (HIPA)	Primary agency responsible for conducting and coordinating training to all government officials involved in the planning and implementation of preparedness, mitigation response and relief work.
State Technical Committee(s)	Responsible for ensuring community participation in the disaster management activities. They will also advise the SEC on implementation of activities at State level.
Department of Revenue and Relief	Member Secretary of SDMA. Member of SEC, Overall coordination, implementation of the EOC activities and documentation and reporting to the SEC,
Department of Public Works (PWD)	Primary agency for maintenance of public infrastructure identifies safer places, assess physical damage, identify safer routes, and provide necessary reconstruction and rehabilitation support. Ensure hazard resistant features as per all building by laws and maintain all National & State roads.
Department of Town and country planning	Primary agency responsible for evolving policy and ensuring land use, hazard wise zonation and implementation building by laws.
Department of Urban development	Main agency to ensure repair and maintenance in the urban areas.
Himachal Pradesh Housing and Urban Development Authority	One of the executing agency for constructions under implementation of recovery and rehabilitation plans. Responsible for ensuring the mitigation measures while construction or reconstruction of its projects in the state.
Department of Education	The department will prepare curriculum related to disaster management and conduct training programme for teachers and children. The department will coordinate with the local authority and arrange for mock drills, search and rescue drills. Awareness campaigns, Volunteer Teams. Ensuring maintenance and retrofitting of school buildings/school safety.

Department of Home	Be the primary agency responsible for “Urban Fire”, “Village fire”, Nuclear disasters, Serial Bomb blasts and Festival related disasters. And also for Security, evacuation, emergency assistance, search and rescue, first aid, law and order, communication, shifting of people to relief camps, traffic management. Burial work of dead bodies, Fire management.
Department of Forest	Be the primary agency responsible for “Forest Fire”. During response and recovery support SEOC with resources. Identification of prone areas, mitigation activities, research and assessment.
Department of Environment, Science and Technology	The primary agency responsible for Avalanches Snow Storms & Environmental & Climate Change Hazards. GIS mapping for effective disaster management. Primary agency of research and development on Climate Change impact and adaptation activities for the State. Provide inputs to the State Disaster Mitigation Committee for new technologies and also for awareness programs.
Department of MPP and Power	Primary agency responsible for Dam failures / bursts and electrical disasters and fires. It will ensure power supply for public facilities such as Hospital, police stations, telecommunication building and meteorological stations. Coordination with Hydro Power Projects.
Department of Information Technology	Overall responsible for the fail proof communication. Maintenance of IT infrastructures and HIMSWAN, maintain communication and satellite links.
Department of Irrigation and Public health	Primary agency responsible for Floods, Water supply and Drought, Issue flood warnings, identification of safer places, construct embankments, arrangement of boats and pump sets, swimmers and divers and communication.
Department of Health	Be the primary agency responsible for “Biological Disasters and Epidemics”. First aid, health and medical care, ambulance arrangements, preventive steps for other diseases, establishment of health camps. Providing Trauma Centres and all other health related support.
Department of Information and Public Relations	Communicate warnings to the public, relay announcements issued by SEC, telecast special programmes for information and actions, education and awareness messages for preparedness actions and coordinated response. Promote disaster related polices, provide emergency communication systems, enable critical communication links with disaster sites and coordinate with media.
Department of Rural Development	Primary agency to implement vulnerability reduction projects to alleviate poverty and improve people’s livelihoods. Ensure Rural development schemes implemented in the State incorporating disaster management measures. Assists in rehabilitation of the victims.
Department of Agriculture	Primary agency for hailstorms, Droughts and pest attacks. To provide seeds and necessary planting material and other inputs to assist in early recovery. Early warning and avert ion of disasters such as Hail Storms and droughts.
Department of Finance	Arrange necessary funds and ensure equitable distribution, manage accounts.
Department of Planning	Allocation of funds on priority basis for disaster mitigation and rehabilitation projects

Department of Transport	Primary agency for Road accidents. Arrange for sending personnel and relief material to the disaster affected area, relocate the affected people, keep access routes operational and inform about alternate routes. Keep an inventory of resources available with Govt. & private operators.
Department of Town and Country Planning	Ensure hazard resistant features are in all building by laws. Zoning for safe construction sites and development of policies.
Department of Technical Education and vocational training	Be the primary agency responsible to conduct certificate training programmes for construction workers. To create a pool of qualified masons to ensure safe construction practices in construction work.
Department of Food, Civil Supplies and Consumers Affairs	Plan for food storage locations keeping in view the necessity. Primary agency responsible for identifying the basic needs of food in the aftermath of a disaster or emergency, to obtain appropriate supplies and transporting such supplies to the disaster area.
Department of Social Justice and Empowerment	Primary agency for building capacities and increasing awareness of disabled persons and women. Organizing special camps for the disabled, widows, children and other vulnerable groups. It will also provide necessary help and assistance for socio-economic rehabilitation.
Department of Industries	Primary agency for landslides and mudflows and mining collapses.
Department of Horticulture	The primary agency for hailstorm and Pest Attack for horticulture sector. Support in crop damage assessment due to disasters.
Department of Animal Husbandry	Primary agency for Animal epidemics. Responsible for fodder assessments, supply and management during disasters and disposal of dead animals.
Department of Panchayati Raj	Ensure training of Panchayati Raj Institutions on disaster management and also ensure that all the development schemes of the department have the component of disaster mitigation as an integral part.
District Administration	The District Disaster Management Authority (DDMA) will act as the district planning; coordinating and implementing body for disaster management and take all measures for the purpose of disaster management in the district in accordance with the guidelines laid down by the State Authority.
International Agencies / NGOs	Provide relief, coordinate with Government, and conduct awareness and capacity building programmes, preparedness activities at community level, assist in reconstruction and rehabilitation.
Department of Tourism	Coordinate in providing temporary shelters, food packages for air dropping.

Roles and responsibility of departments vis-a-vis Emergency Response has been finalised as ESF. Detailed ESF Plan as approved by the SEC has been placed as Annexure – VIII.

6.6 Standard Operating Procedures for Responsible Departments / Agencies

The existing hazard exposure of the state of Himachal Pradesh its people and infrastructure is very high. In order to combat the potential threat and to mitigate multiple risks it is imperative that a coordinated intervention through key stakeholders and Emergency Response System is put into place every six months. The concerned department will initiate envisaged actions and nodal officers identified by each department will provide necessary horizontal & vertical linkages.

These procedures shall be updated and revised every six month incorporating the new insight experience and understanding of vulnerability & risk perceptions and disaster that take place with the passage of time.

The departments, divisions and agencies will organize proper training of officers and staff so that they can help in rescue, evacuation and relief work at different stage of disaster. Emergency responses teams will be kept ready by each department so that they can move to disaster site/affected area on short notice. The Standard operating procedure shall be followed during normal times, warning stage, disaster stage and post disaster stage. Standard Operating Procedures for the relevant departments are listed below:

>> Department of Revenue and Relief

Primary Tasks:

- To coordinate with Govt. of India & National Disaster Management Authority.
- To function as a secretariat of the State Disaster Management Authority.
- To coordinate the Relief Recovery operations in the wake of disasters.
- To declare and notify Disaster Situation.

Preparedness function

- Establish infrastructure for State EOC and maintain it in state of readiness with all equipment in working order and all inventories updated.
- Train personnel on operations of EOC.
- Ensure basic facilities for personnel who will work at district level for disaster response.
- To coordinate the preparedness functions of all line departments.
- Establish disaster management funding mechanisms to ensure adequate resources for preparedness work, and quick availability of resources for relief and rehabilitation when required.
- Help DDMA with additional resources for disaster preparedness.
- On annual basis report to the SEC of the preparedness activities.
- Establish and activate help lines through police and health departments and district public relations office.
- Prepare a list of potential shelters with clearly specifying their capacity and check upon their suitability for accommodating people with varying social behavior.
- Prepare a plan for the disposal of dead bodies and carcasses.
- Constitute / activate Village-level Preparedness Teams with the help of PRIs local NGOs and revenue officials.
- Prepare & update inventory of resources every quarter.
- Coordinate with National & International Institutions
Development of policies
- Facilitate convening the meeting of District Disaster Management Authority
- Annually update the District Disaster Management Plan.
- Maintain and activate the District level EOC.
- Establish communications with state EOC and all stakeholders at all levels for purpose of receiving and sending warning and information exchange through district control room.
- Ensure collation of expense accounts for sanctions and audits.

Mitigation

- Ensure that funds are being allocated under the State Mitigation Fund.
- Ensure that structural and non-structural mitigation measures are taken by all its department offices.
- Establish warning system between State – District and in high risk zones.
- Monitor implementation of construction norms for all types of buildings and infrastructure.

Alert and Warning Stage

- Maintain contact with forecasting agencies and gather all possible information regarding the alert.
- Ensure activation of State level EOC in standby mode.
- Instruct all ESFs to remain in readiness for responding to the emergency.
- Advise concerned DDMA to carry out evacuations where required, and to keep transport, relief and medical teams ready to move to the affected areas at a short notice.
- Dispatch field assessment teams, if required.
- Provide assessment report to the SDMA.

Response

- Activate EOC in full form
- Coordinate and plan all activities with the ESFs
- Conduct Rapid Assessment and launch Quick Response.
- Conduct survey in affected areas and assess requirements of relief
- Distribute emergency relief material to affected population.
- Coordinate all activities involved with emergency provisions of temporary shelters, emergency mass feeding, and bulk distribution of coordinated relief supplies for victims of disasters.
- Coordinate with GREF, ITBP, Army, and Indian Air Force as per the demand of the situation.
- Prepare an evacuation plan for villages which are devastated or affected.
- Ensure the supply of food grains through the Public Distribution System.
- Prepare a list of relief items to be distributed.
- Formulate sector specific teams such as transport, material and equipment for responding to the disaster incident.
- Prepare a transportation plan for supply of relief items.
- Convene meetings of all NGOs, Youth Clubs, and Self Help Groups operating in the district and assign them unambiguous responsibilities for relief, recovery and rehabilitation.
- Ensure to establish and manage relief camps through key departments responsible for ESF.
- Call for emergency meeting to take stock of the situation. Develop an action plan.
- Appoint In-charge Officers of Response base.
- Ensure damage and need assessment through teams formed through concerned department.
- Commence functioning of IRS and ESF systems.
- Recall important functionaries from leave; communicate to the staff to man their places of duties like the ward and divisional offices and respective departments.
- Ensure that panic does not occur.
- Activate all emergency communications.
- Coordinate NGO, INGO and international agencies interventions/support.
- Ensure media briefing through a DPRO or an officer specifically designated for the purpose.

Recovery and Rehabilitation

- Ensure preparation of rehabilitation plan for displaced population through ULBs/PRIs etc.
- Organise initial and subsequent technical assessments of disaster affected areas and determine the extent of loss and damage and volume and nature of relief required.
- Keep the SDMA informed of the situation.
- Ensure supply of food, drinking water, medical supplies and other emergency items to the affected population.
- Visit and coordinate the implement of various rehabilitation programmes.
- Coordinate the activities of NGOs in relief and rehabilitation programmes.
- Allocate funds for the repair, reconstruction of damaged infrastructure after considering their overall loss and damage.
- Ensure Provision of Nutritional aspects of food for disaster victims.
- Prepare an evacuation plan for population from the dangerous area / buildings as per the advice of agencies identified for issuing warnings before, during & after the incident.
- Ensure immediate disbursement of compensation.

Checklist:

Sr. No.	Preparedness Measures	Action Taken/Remarks
1	Update District Disaster Management Plan twice a year specifically with reference to the resources and improved HVRA.	
2	Check upon communication network; phones, wireless, fax, internet, HAM network every month.	
3	Identify and determinate Hazard wise most vulnerable & risk prone pockets quarterly.	
4	Activate District Control Rooms establish communication with sub-division, The, Block & Village level functionaries in the close proximity affected area.	
5	Fix the location of Response base	
6	Designate In-charge officials of the response base.	
7	Check the availability and deployment of resources and mobilize them.	
8	Convene meetings of District Disaster Management Authority once in three months	
9	Convene civil defense, NGOs, PRIs and ULBs meetings prepare a list of NGOs, PRIs and ULBs with their Functional Specialization and Geographical Coverage.	
10	Check the availability of Food Grains in PDSs shops and other stocking and distributors in the district	
11	Prepare a list of relief items for distribution division wise keeping in view the food habits of people	
12	Determine quantity of relief items as per minimum standards and expenditure to be incurred in it.	
13	Prepare a transport and alternate transport plan for evacuation and distribution of relief	
14	Prepare a plan for VIP's movement.	
15	Prepare a media plan for dissemination of information to the people of the district; local newspaper , radio, TV and cable, etc	
16	Ensure appropriate stocking of relief material received from outside.	

>> Department of Home

Department of Home has an important role of providing security, logistics, and if necessary, assistance in distribution of relief items and provision of equipment for emergency response.

Primary Tasks:

- Maintain Law & Order
- Facilitate the evacuation of affected people
- Undertake search & rescue
- Ensure protection safety of relief & rehabilitation efforts.

Preparedness function

- Designate one Liaison Officer in the department as the Disaster Preparedness Focal Point.
- Prepare an operational Plan for responding to any type of disaster.

- Establish, maintain and train state search and rescue response team. Impart training to the members of Police Force in first aid, evacuation, rescue and relief operations.
- To conduct Search and Rescue training to local volunteers.
- Prepare an inventory of all man power and equipment available.
- To prepare an inventory of volunteers who have already completed training courses successfully and can be utilized in the search and rescue operations. Identify the 'High Risk' and 'Risk' areas for different disasters and instruct the existing police installations located in those areas for keeping themselves in readiness for undertaking emergency rescue, evacuation relief operations. Arrange drills for fire extinguishing, rescue, evacuation and transportation of injured persons and prepare coordinated Action Plans in cooperation with District administration and concerned local agencies
- Constitute district wise 'Search & Rescue' Teams from the Police and arrange training for these units.
- Hold quarterly mock drills on disaster preparedness and response.
- Installation of radio communication at-
 - District Police Control Room and SP Office.
 - Control room at affected site.
- Keep the police vehicles and other transport in readiness for deployment of the police.
- Make an inventory of resources.
- Review quality maintenance of equipment & machinery constitution.
- Identify most vulnerable areas/pockets in each police districts.
- Ensure the availability of adequate warning mechanism for evacuation
- Identify alternative routs in hotspots.
- Identify the departmental needs for dealing with the disaster.
- Prepare a Deployment Plan for Police force, based on the needs of the most vulnerable areas.
- Ensure that a sufficient number of Police force is available for responding to disaster situation.
- Organize training for police officer to handle disaster/crisis situation.

Mitigation function

- Make departmental mitigation plan and ensure its implementation.

Alert and Warning Stage

- Depute one liaison officer for the SEOC.
- Issue written cautionary instructions to all concerned.
- Maintain communications with the police installations in the areas likely to be affected by disaster.
- Inform nearest police station (from the likely disaster affected area) for dissemination of warning.
- Instruct all concerned to accord priority to disaster related wireless messages if required by appropriate officials.
- On receipt of directives from the SEOC for evacuation - organize personnel and equipment for evacuation and undertake evacuation operations.
- Earmark a reserve task force, if needed.
- Move task forces to the convenient positions, if needed.

Response

- Call for emergency meeting to take stock of the situation. Develop an action plan.
- Designate an area, within Police Station to be used as help line center for public.
- Send task forces in disaster affected areas.
- Carry out search and rescue operations.
- Carry out fire fighting operations
- Maintain law and order, especially during relief distribution.
- Keep close watch for any criminal and anti-state activity in the area.

- Keep direct contact with different officers like District EOC for taking any steps to combat any situation.
- Dispatch situation reports to the DEOC and SEOC.
- Provide guards wherever needed particularly for staging area of cooperative food etc food stores and distribution centers.
- Provide convoys for relief materials.
- Establish coordination with the Fire Services.
- Coordinate with military service personnel on the area.
- Evacuation will be ordered by Deputy Commissioner, Addl. Commissioner and Superintendent of Police.
- Patrolling for checking looting by antisocial elements.
- Dispatch Police to systematically identify and assist people and communicate in life-threatening situation.
- With the assistance of health professional, help injured people and assist the community in organizing emergency transport of seriously injured to medical treatment centers.
- Assist and encourage the community in road cleaning operation.
- Review & Draw the traffic plan and assess and identify road for the following conditions/facilities.
 - One Way
 - Blocked
 - Alternate route
 - Overall Traffic Management
 - Other access roads
- Under appropriate security, Law and Order, the evacuation of community and livestock should be undertaken with assistance from community leaders.
- All evacuation must be reported to Deputy Commissioner and Superintendent of Police immediately.

Recovery and Rehabilitation

- Assist local administration in removing the dead bodies and debris in affected areas.
- Assist in Setting up field hospital if required.
- Participate in reconstruction and rehabilitation operation if requested.
- Arrange security of government property and installations damaged in a disaster.
- Coordinate with other offices for traffic management in and around damaged areas.
- Assist the local administration in putting a stop to theft and misuse in relief operation.
- Provide security in transit and relief camps, affected villages, hospitals and medical centers and identify areas to be cordoned off.
- Provide security arrangements for visiting VVIPs and VIPs.
- Assist district authorities to take necessary action against Hoarders, Black Marketers and those found manipulating relief material.
- In conjunction with other government officers, activate a public help-line to:
 1. Respond to personal inquiries about the safety of relatives in the affected areas.
 2. Respond to many specific needs that will be given.
 3. Serve as a rumor control center.
 4. Confidence building among the public.
- Make officers available to inquire into and record deaths, as there is not likely to be time or personal available, to carry out Standard Post-mortem Procedures.
- Monitor the needs and welfare of people sheltered in relief camps.
- Adequate Security to International Agencies/Countries personnel for Search & Rescue Medical Assistance and Security for their relief material and equipment etc.
- Manage Traffic/Crowd. Recall important functionaries from leave, communicate to the staff to man their places of duties like the ward and divisional offices and respective department.

Checklist:

Sr. No.	Preparedness Measures	Action taken/ Remarks
1	Prepare a deployment plan for police forces	
2	Check the availability and readiness of the search and rescue teams within the district police	
3	Check adequacy of wireless communication network and setup links with the SEOC DEOC and at Sub-divisional level to reach out the affected area.	
4	Develop a traffic plan for contingencies arising out of disasters – alternative routs and traffic diversion etc.	
5	Develop a patrolling plan for controlling the activities for controlling the activities of anti social elements, critical infrastructure and affected villages/locality/shelters/relief camps.	
6	Keep the police vehicles and other modes of transport available in readiness.	
7	Prepare a Plan for VIP movements to the disaster affected areas.	
8	Identify anti social elements that could take undue advantage and take suitable preventive actions.	
9	Coordinate with NGOs and provide them with adequate security.	

>> Department of Transport

<p>Primary Tasks:</p> <ul style="list-style-type: none"> • Arrange and organize transport for ensuring supplies to the affected villages and evacuation of the victims. • Facilitating the movement of Emergency teams. • Facilitate evacuation of people • Grant Transport of relief material to the affected area
<p>Non Disaster Time – Preparedness</p> <ul style="list-style-type: none"> • Designate one Liaison Officer of the department as the Focal Point and inform all concerned. • Develop disaster management plan for the department. • Carry out survey of condition of all highway systems at state and district level. • Carry out survey of condition of all aircraft landing facilities. • Prepare an inventory of vehicles trucks, buses, jeeps, tractors etc of government and private agencies district wise and provide the list to the State EOC and District control room. • Issue standing instructions to the State transport department for providing buses for evacuation and relief.
<p>Non Disaster Time – Mitigation</p> <ul style="list-style-type: none"> • Make departmental mitigation plan and ensure its implementation.
<p>Alert and Warning Stage</p> <ul style="list-style-type: none"> • Depute an officer at the SEOC. • Ensure availability of fuel, recovery vehicles and equipment. • Take steps for arrangement of vehicles for possible evacuation of people
<p>During Disaster – response</p> <ul style="list-style-type: none"> • Call for emergency meeting to take stock of the situation. Develop a strategy and objectives. • Establish contact with the SEOC. • Take steps for transportation of relief personnel and material to affected areas. • Take steps for movement of affected population to safer areas.

- Collate and disseminate information regarding operational and safe routes and alternate routes, fuel availability etc. to personnel operating in the field.
- Launch recovery missions for stranded vehicles.
- Launch repair missions for damaged critical infrastructure and routes.
- Recall important functionaries from leave, communicate to the staff to man their places of duties like the ward and divisional offices and respective departments.
- Provide trucks, buses, jeeps, tractors etc for evacuation and for ensuring supply chain continuity.

After Disaster – Recovery and Rehabilitation

- Assess damage to transportation infrastructure.
- Take steps to ensure speedy repair and restoration of transport links.

>> Department of Public Works

Primary Task:

- To ensure the trouble free road communication.
- To evolve and implement earthquake design of building design of building.
- To evolve appropriate code and guidelines.
- To inspect buildings & critical buildings for their safety.
- To coordinate with BRO for road traffic ability.
- To ensure appropriate designs of structures in areas of operation such as roads, bridges & buildings.

Non Disaster Time – Preparedness

- Designate one Liaison Officer in the department as the Disaster Preparedness Focal Point.
- Take precautionary steps for the protection of government property against possible loss and damage during disaster.
- Formulate guidelines for safe construction of public works.
- Prepare list, with specifications and position, of heavy construction equipment in the state.
- Organize periodic training of engineers and other construction personnel on disaster resistant construction technologies.
- Procure HRV analysis of PWD.
- Based on HRV analysis, prepare a Contingency Action Plan division wise and vulnerable zone wise plan.
- Establish communication with State Emergency Operations Center, District Control Rooms and departmental HQ within the division and state.
- Create an inventory of Earth moving machinery available with each division and with private contractors.
- Create linkage and communication with power project authorities and identify resources available with them.
- Make an unambiguous written agreement for mobilization of private resources at the time of crisis.
- Officers at SDO level should be familiar with pre-disaster precautions and during and post-disaster procedures for road clearing and for defining safe evacuation routes.
- Review and update measures and procedures taken for the maintenance and protection of equipment.
- Clear areas beneath bridges to ensure smooth flow of water and especially prior to the monsoon season.
- Undertake rapid visual inspection of critical buildings and structures of the state government (including hospital buildings) by a specialized team and identify structures which are endangered requiring retrofitting or demolition.
- Emergency tools kit should be assembled for each division and should include:
 - Crosscut saws

- Axes
- Power chain saw with extra fuel, oil
- Sharpening files
- Chains and tightening wrenches
- Pulley block with chain and rope
- Cutters and Cranes
- Routes strategic to evacuation and relief should be identified and marked in close coordination with police and DEOC.
- Within the cities establish priority listings of roads which will be cleared and opened, among the most important are the roads to hospitals and main trunk routes.
- Identify locations for setting up transit and relief camps, feeding centers.

Non Disaster Time – Mitigation

- Actively work to develop a sustainable state-wide hazard mitigation strategy.
- Repair, Maintenance and retrofitting of public infrastructure.
- Identify / prioritize mitigation activities of lifeline buildings and critical infrastructure and coordinate with the SDMC members for its implementation.
- Report to State Disaster Mitigation Committee about mitigation plans.

Alert and Warning Stage

- Establish radio communications with State Emergency Operations Centre
- Instruct all officials at construction sites to keep manpower and materials prepared for protection and repair of public works.
- Direct construction authorities and companies to pre-position necessary workers and materials in or near areas likely to be affected by disaster.
- Vehicles should be inspected, fuel tanks filled and batteries and electrical wiring covered as necessary.
- Dispatched extra vehicles from headquarters to be stationed at safe strategic spots along routes likely to be affected.
- Move heavy equipments, such as front-end loaders, to areas likely to be damaged.
- Inspect all roads, road bridges by a bridge engineer, including underwater inspection of foundations and piers. A full check should be made on all concrete and steel works.
- Secure works under construction ropes, sandbags, and cover with tarpaulins if necessary.
- If people are evacuating an area, the evacuation routes should be checked and people assisted.
- Identify locations for setting up transit and relief camps, feeding centres and quantity of construction materials and inform SEOC accordingly.

During Disaster – Response

- Provide assistance to the damage assessment teams for survey of damage to buildings and infrastructure.
- Adequate road signs should be installed to guide and assist the drivers.
- Begin clearing roads. Assemble casual labourers to work with experienced staff and divide into work gangs.
- Mobilize community assistance for road clearing by contacting community organizations.
- Undertake repair of all paved and unpaved road surfaces including edge metal ling, pothole patching and any failure of surface, foundations in the affected areas and keep monitoring their conditions.
- Undertake construction of temporary roads to serve as access to temporary transit and relief camps, and medical facilities for disaster victims.
- As per the decisions of the State Emergency Operations Center undertake construction of temporary structures required, for organizing relief work and construction of relief camps, feeding centres, medical facilities, cattle camps and SOC/s.
- Take steps to clear debris and assist search and rescue teams.
- Provide sites for rehabilitation of affected population
- The concerned Executive Engineer will be responsible for mobilizing staff and volunteers to

clear the roads in case of any blockage.

- All response at district level teams should be provided with two way communication link.

After Disaster – Recovery and Rehabilitation

- Carry out detailed technical assessment of damage to public works.
- Assist in construction of temporary shelters.
- Organize repairs of buildings damaged in the disaster
- Prepare detailed programs for rehabilitation of damaged public works.
- Arrange technical assistance and supervision for reconstruction works as per request.
- Mobilize community assistance for road clearing by contracting community organizations.
- Undertake clearing of ditches, grass cutting, burning or removal of debris and the cutting of dangerous trees along the roadside in the affected area through maintenance engineer's staff.
- As per the decisions of the DDMA , undertake construction of temporary structures required for organizing relief work and construction of relief camps, feeding centers , medical facilities, cattle camps and SITE OPERATIONS CENTERS.
- An up-to-date report of all damage and repairs should be kept in the Executive Engineer's office and communicate the same to the District Control Room & SEOC.

>> Department of Irrigation and Public Health

Primary Tasks:

- To act as nodal agency for floods.
- To ensure the availability of water supply.
- To ensure the operation of irrigation system.
- To undertake necessary steps for flood protection and management.
- To undertake drought management measures.

Non Disaster Time – Preparedness

- Designate one Liaison Officer in the department as the Disaster Preparedness Focal Point.
- Ensure efficient management of flood forecasting and warning centres and improve procedure of flood forecasts and intimation to appropriate authorities.
- Identify flood prone areas and activate flood monitoring mechanisms.
- Operate Flood Information Centre in the flood season every year.
- Collect all the information on weather forecast, water level of all principal.
- Draw a schedule for chlorination and other required bacteriological analysis for ensuring safe public water supply.
- Keep in readiness essential tool kits and protection material at critical places for emergency deployment. These may include:
 - Empty Cement Bags
 - Boulders
 - Ropes
 - Sand
 - Wire mesh
 - Shovels
 - Baskets
 - Lights
 - First Aid Kit
- Officers should ensure that all staff is well aware of precautions to be taken to protect their own lives and personal property.
- Materials likely to be damaged by rains, such as cement bags, electric motors, office records etc should be covered with plastic even though stored inside.
- Check all the rain-gauge stations and ensure that they are functioning properly. Check that the readings from these stations are availability immediately to the irrigation Department.
- Procure / prepare HRV analysis for water resource management and flood protection.

- Based on HRV analysis, prepare department specific Contingency Action Plan.
- Review and update precautionary measures and procedures and review with staff the precautions that have been taken to protect the equipment and machinery in the wake of any disaster.
- Keep Standby diesel in petrol pumps or generators in damage- proof buildings.
- A standby water supply plan should be available in the event of damage or pollution of the regular supply sources in disaster prone areas.
- Establish procedures for the emergency distribution of water if existing supply is disrupted.
- Make an inventory provisions to acquire tankers and establish other temporary means of distributing water on an emergency basis.
- Make an inventory provision to acquire containers and storage tanks, required for storing water on an emergency basis.
- Make an inventory of resource status division wise.
- Prepare a plan for upkeep and maintenance of equipment.
- Prepare for water distribution to all transit and relief camps, affected villages and cattle camps and ensure proper execution of these plans.
- Where ever possible make sure auxiliary generators and standby engines are in good working order.

Non Disaster Time – Mitigation

- Make departmental mitigation plan and ensure its implementation.
- Review and update precautionary measures and procedures.

Alert and Warning Stage

- Alert SEOC in the event of floods.
- Since flash floods get triggered within short time-spans, take steps to alert all through telephone and wireless according to needs.
- Organize on the receipt of flood warning or any other disaster continuous monitoring of
 - Wells
 - Intake structures
 - Pumping stations
 - Buildings above ground
 - Pumping mains
 - The treatment plant
- Mount watch on flood protection works and irrigation and water supply systems.

During Disaster – Response

- Transportation of water with minimum wastage (in coordination with local administration).
- Locate drinking water facilities separate from sewer and drainage facilities
- Ensure that remaining or unaffected sources of water do not get contaminated and the distribution of water is equal to all victims in the area affected.
- Identify and mark damaged water pipelines and contaminated water bodies and inform disaster victims against using them.
- Recall important functionaries from leave communicate to the staff to man their places of duties like the ward and divisional officers and respective department.
- Repair damaged pipes, blocked sewages and salvage important and damaged facilities.
- Organize round the clock inspection and repair of :
 - Dams, Check dams
 - Irrigation Channels(Kulhs)
 - Control gates
 - Overflow channels
- Organize round the clock inspection and repair of:
 - Pumps
 - Generators
 - Motor equipment

- Make sure the water supply to key establishment such as fire hydrants and hospital storage tanks is full and the hospital is conserving water.
- Inform people to store an emergency supply of drinking water.
- Establish emergency works gangs for immediate post-disaster repairs.
- After any repair on the distribution system, the required main should be flushed and disinfected with a chlorine solution of 50mg/ liter for a contact period of 24 hours. After which the main is emptied and flushed again with potable water.
- If the demand for water is urgent, or the repaired main cannot be isolated, the concentration of the disinfecting solution may be increased to 100mg/liter and the contact period reduced to 1 hour.
- At the end of disinfection operations, but before the main is put back into services, samples should be taken for bacteriological analysis and determination of chlorine residue.
- Recall important functionaries from leave: communicate to the staff to man their places of duties like the ward and divisional offices and respective departments.
- Call for emergency meeting to take stock of the situation. Develop a strategy and objectives.
- Identify unacceptable water sources and take necessary precautions to ensure that no water is accessed from such sources, either by sealing such arrangements or by posting the department guards.

After Disaster – Recovery and Rehabilitation

- Carry out Environmental Impact Assessment of the disaster.
- Take up sustained programs for rehabilitation of flood protection works, water supply schemes, check dams and kulhs.
- Take up afforestation drives for rehabilitation of vegetative cover lost in disaster.
- Protect pump stations from water ingress in the stream beds or banks.
- Repair sewage lines where damage is detected.
- Repair water pipelines wherever damaged.
- Ensure that potable water supply is restored as per the standards and procedures laid down in 'Standards for Potable Water'.

Checklist:

Sr. No.	Preparedness Measures	Action Taken/ Remarks
1	Check the condition of pumps for water supply, ensure pumps are in working condition.	
2	Keep hand pumps, pipes and sockets in readiness for installation/increase the height of pipes.	
3	Obtain a list of temporary shelters where people took shelter during last disaster. Prepare for installation of hand pumps or other mode of water supply at all such locations.	
4	Maintain adequate stock of chlorine tablets and bleaching powder.	

>> Department of Agriculture

Primary Task:

- To act as nodal department for drought related disasters
- To undertake need & damage assessment with respect to crops of all types.
- To ensure the uninterrupted functioning of all infrastructures related to agriculture sector.
- To assist the farming community in restoration & relocation efforts.

Non Disaster Time

- Designate a focal point for disaster management within the department.
- Procure HRV analysis for the State and Identify most vulnerable areas
- Identify areas likely to be affected.
- Organize distribution of seeds, seedlings, fertilizer and implements to the affected people.
- Arrange for keeping stock of seeds, fertilizers and pesticides.
- Develop district contingency action plan based on HRV.
- Establish communication with SEOC, DDMA, Deputy Commissioner and District Control Room and Agriculture Universities.
- Review and update preventive measures and procedures
- Check available stocks of equipment and materials which are likely to be most needed during disaster like floods and droughts.
- Determine the type of damage, pests or disease may cause crop wise and identify the insecticide required for the purpose, in addition to requirement of setting up extension teams for crop protection and accordingly ensure that extra supplies and materials, be obtained quickly.
- All valuable equipments and instruments should be packed in protective coverings and stored in room the most damage-proof.
- Suggest variety of seeds and cropping pattern, which can reduce losses and reduce the risks to farmers.
- Ensure that certified seeds of required varieties are available in adequate quantities..
- Develop a pest and disease monitoring system so that timely steps can be taken to reduce damage to crops.

Warning

- Check available stocks of equipments and materials which are likely to be most needed after the disaster.
- Stock agricultural equipments which may be required after a disaster
- Provide information to all concerned, about disasters, likely damages to crops and plantations, and information about ways to protect the same.
- All electrical equipments should be unplugged when disaster warning is received and especially in flood prone areas.

During Disaster

- Depute one liaison officer to the SEOC.
- Monitor damage to crops and identify steps for early recovery.
- Estimate the requirement of
 - Seeds
 - Fertilizers
 - Pesticides and Labour
- Organise transport, storage and distribution of the above with adequate record keeping procedures.
- Ensure that adequate conditions through cleaning operations are maintained to avoid water-logging and salinity.
- Print and widely distribute the list of points where certified seeds are available along with names of varieties and rates. Notices may be affixed at public places such as bus stands, on buses themselves, PHCs, Block headquarters, Tehsils etc.
- Recall important functionaries from leave: communicate to the staff to man their places of duties like the ward and divisional offices and respective departments.
- Call for emergency meeting to take stock of the situation. Develop a strategy and objectives.
- Establishment information centers through KVKS and extension network and assist in providing an organized source of information.

After Disaster

- Quantify the loss and damage within the quickest possible time and finalizes planning of agriculture rehabilitation.

- Ensure availability of adequate supply of seeds, seedlings, fertilizers, pesticides and agricultural implements.
- Assist farmers to re-establish their contacts with agriculture produce market and ensure that appropriate prices be offered to them.
- Provide information to NGOs and other organization about the initiative and resources of the department.
- Assess the extent of damage to soil, crop, plantation, micro-irrigation systems and storage facilities and the requirements to salvage or re plantation through KVKS.

Checklist:

Sr. No.	Preparedness Measures	Action Taken/ Remarks
1	Check the availability of seeds and disseminate information about the outlets where seeds can be made available.	
2	Set up a public information center for providing information sowing of crops, alternative crops, pests and application of fertilizers.	
3	Prepare a schedule for spray of pesticides and insecticides after the disaster.	

>> Department of Animal Husbandry**Primary tasks:**

- Provide necessary assistance in ensuring the protection of animal stock of the state.
- Develop strategy and plan for animal related issues vis-à-vis disasters.
- Control & check any outbreak of epidemics.
- Make an inventory of all veterinary centers and assess their capacity to handle disaster situation.
- Develop protocol for disposal of bodies of dead animals.

Non Disaster Time

- Designate a focal point for disaster management within the department.
- Procure / Prepare HRV Analysis of Animal Husbandry sector in the state of HP & District wise.
- Identify areas likely to be affected.
- Identify disaster prone areas, livestock population at risk, requirement of medicine, vaccines, equipments, disinfectants and other materials material require any material during disaster in prone area.
- Prepare inventory of human recourses along with their contact number (Veterinary Doctors, Para Vets, and Class-IV).
- Based on HRV analysis, prepare state wise & district wise plan for feed procurement
- Identify shelters for animals.
- Review and update precautionary measures and procedure for equipments protection.
- Prepare a list of water borne diseases that are preventable by vaccination. Publicize the information about common diseases afflicting livestock and the precautions that need to be taken.
- Stock emergency medical equipment which may be required during and post disaster.
- Determine what injuries / illness may be expected, and what drugs and other medical items will be required, in addition to requirements of setting up cattle camps.
- Check stocks of equipment and drugs which are likely to be most needed during and after disaster.
- Capacity building of all veterinary hospitals staff in dealing with likely damages and effects in the aftermath of disaster.

- Prepare kits for veterinary diseases, which could be provided to veterinary doctors at the block level and extension officers at the village level. The kits may also be provided to village level veterinary volunteers.
- The provision of medical services should be coordinated by the District Animal cattle camps.
- An injury and disease monitoring system should be developed, to ensure that a full picture of risk is maintained.
- Identify sites for cattle camps by ensuring the following:
 - Cattle sheds constructed should not exceed 20 sq. feet per animal.
 - There is adequate supply of drinking water.
 - There is sufficient shade for cattle to rest during the afternoon.
 - They are accessible.
 - They are conveniently located to be as close as possible to the affected villages.

Warning

- Check available stocks of equipments and materials which are likely to be most needed after the disaster.
- Stock Veterinary equipments which may be required after a disaster
- Determine what damage, pests or diseases may be expected, and what drugs and other insecticide items will be required, in addition to requirements of setting up extension teams for animal protection, and accordingly ensure that extra supplies and materials, be obtained quickly.
- All valuable equipments and instruments should be packed in protective coverings and stored in room the most damage-proof.
- Check the emergency electrical generator, to ensure that it is operational and that a buffer stock of fuel exists.
- Fill department vehicles with fuel and park them in a protected area.
- Fill hospital water storage tanks and encourage water savings. If no storage tanks exists water for drinking should be drawn in clean containers and protected.
- Prepare an area of the hospital for receiving large number of livestock.
- Develop emergency admission procedures (with adequate record keeping)
- The sterilized surgical packs must be stored in protective cabinets to ensure that they do not get wet. Covering the stock with polythene is recommended as an added safety measures.
- All valuable equipments and instruments should be packed in protective coverings and stored in room the most damage proof.
- All electrical equipments should be unplugged when disaster warning id received especially in flood prone areas.

During Disaster

- Depute one liaison officer to the SEOC to facilitate quick coordination between SEOC and parent department.
- Rush Rapid Assessment Team to Incident site to assess the quantum of damage and immediate requirement for relief and rescue
- Rush quick team along with the needed medicines equipments and other materials for relief and rescue operation at disaster site to minimize further loss and damage.
- Arrange for quick and proper disposal of carcasses with disinfection of the premises with the help of local people, other line department in coordination with SOEC to check the spread of epidemic.
- To take immediate preventive measures like quarantine, immunization and culling etc. as per requirement of the situation.
- Develop a strategy for rehabilitation of affected animals.
- Establish radio communication with
 - SEOC
 - Deputy Commissioner
 - District Control Room
 - Veterinary aid centers and hospital (including private practitioners) within the division.

- Arrange for emergency supplies of anesthetic drugs.
- Provide information to the local police and rescue groups about the resources available with veterinary aid centers and hospital.
- The minimum number of cattle in the camp should be about 50 and the maximum 300.
- Make provision for 6kg per cattle head per day of fodder, and 1 to 1.5kg per cattle head per day or any other concentrate
- Organize vaccination campaigns in disaster prone villages
- Cattle camps and hospitals administrators should
 - Establish work schedules to ensure that adequate staff are available.
 - Set up teams of veterinary doctors and assistants for visiting flood affected sites.
- Organize transfer of serious injured livestock from villages to veterinary aid centers wherever possible.
- Establish cattle camps and additional veterinary aid centers at affected sites and designate an Officer In-charge for the camp.
- Estimate the requirement of water, fodder and animal feed, for cattle camps and organize the same.
- Ensure that adequate sanitary conditions through cleaning operations are maintained in order to avoid outbreak of any epidemic.

After Disaster

- Quantify the loss and damage within the quickest possible time and finalize planning for rehabilitation.
- Coordinate with revenue Department to ensure relief distribution as per direction of the State Govt./ already laid down norms by the Govt.

Preparedness Checklist for Animal Husbandry:

Sr. No.	Preparedness Measures	Action Taken/ Remarks
1	Prepare and publicize the list of common disaster specific ailments and possible precautions for the farmers to observe.	
2	Organize vaccination for cattle in disaster villages.	
3	Prepare a plan for setting up cattle camps and cattle feeding centers.	
4	Prepare kits which could be given to Veterinary doctors and Animal Husbandry workers/volunteers.	
5	Prepare a plan for disposal of dead animals	
6	Prepare a plan for feed storage centers.	

>> Department of Education

Primary tasks:

- The department will prepare curriculum related to disaster management and conduct training programme for teachers and children.
- The department will coordinate with the local authority and arrange for mock drills, search and rescue drills

Non Disaster Time – Preparedness

- Identify one Liaison Officer in the department as Disaster Management Focal Point.
- Develop a state disaster management plan for the department
- In consultation with SDMA, include disaster related subjects in the curricula in schools, and

<p>colleges.</p> <ul style="list-style-type: none"> • Arrange for training of teachers and students of disaster prone areas about the steps to be taken at different stages of disaster and organise them, in coordination with volunteers and inspire them for rescue, evacuation and relief works. • Ensure that all schools and colleges develop their disaster management plans. • Ensure that construction of all educational institutions in earthquake zones is earthquake resistant.
<p>Non Disaster Time –Mitigation</p> <ul style="list-style-type: none"> • Identify structural and non structural mitigation measures. • In coordination with the SSA and/or Public works department assess schools and colleges buildings conditions. • Make departmental mitigation plan and ensure its implementation. • Ensure that earthquake resistant features are included in new school buildings.
<p>During Disaster – response</p> <ul style="list-style-type: none"> • In the event of disaster, place required number of education institutions and their buildings, under the SEOC for use as emergency shelter and relief centre if necessary. • Students and staff can provide local voluntary assistance for distribution of relief material and assistance to special needy people in the locality.
<p>After Disaster – Recovery and Rehabilitation</p> <ul style="list-style-type: none"> • Determine the extent of loss in educational institutions and prepare plans for their rehabilitation.

>> Department of Technical Education and vocational training

<p>Primary tasks:</p> <ul style="list-style-type: none"> • The department will play a vital role in the State mitigation strategy. Its main role will be to conduct training programs to the construction workers, involved at the community level.
<p>Non Disaster Time – Preparedness</p> <ul style="list-style-type: none"> • In consultation with SEC, include disaster related subjects in the curricula. • Arrange for training programs and certificate course of construction workers. • Prepare a disaster management plan for the department
<p>Non Disaster Time –Mitigation</p> <ul style="list-style-type: none"> • To prepare an inventory of volunteers who have already completed training courses successfully and can be utilized in implementation of mitigation measures and new construction.
<p>During Disaster – Response</p> <ul style="list-style-type: none"> • Within the department, respond as per the departmental response plan
<p>After Disaster – Recovery and Rehabilitation</p> <ul style="list-style-type: none"> • Coordinate with SDMA and DDMA for the recovery and rehabilitation

>> Department of Rural Development

<p>Primary tasks:</p> <ul style="list-style-type: none"> • Department of Rural development is one of the main departments that have the mandate to implement vulnerability reduction projects to alleviate poverty and improve people's livelihoods.
<p>Non Disaster time - Preparedness</p>

<ul style="list-style-type: none"> • Designate one Liaison Officer in the department and the district as the Disaster Management Focal Point. • Develop a state disaster management plan for the department • Prepare maps showing population concentration and distribution of resources. • Encourage disaster resistant technological practices in buildings and infrastructure. • Encourage the people in earthquake prone areas to adopt earthquake resistant technologies. • Report activities in periodic meetings of the State Executive Committee. • In coordination with PWD conduct regular training to the engineers of the department.
Non Disaster time - Mitigation
<ul style="list-style-type: none"> • On the basis of its developmental responsibility, liaise with other line departments and agencies for a coordinated mitigation approach. • In coordination with the State Mitigation task force, conduct building assessments, identification of structural and non structural mitigation activities.
Alert and Warning Stage
<ul style="list-style-type: none"> • Activate Disaster Management Focal Point. • Focal Point in department to keep in touch with the SEOC. • Alert all concerned about impending disaster. • Ensure safety of establishments, structures and equipment in the field • Ensure formation of committee for rescue, relief and rehabilitation work and local volunteer teams.
During the Disaster – Response
<ul style="list-style-type: none"> • Ensure information flow from affected district and maintain regular contact with EOC (24 hrs). • Ensure availability of drinking water at times of need. • Provide necessary infrastructure to carry out relief works • Assess initial damage
After Disaster - Recovery and Rehabilitation
<ul style="list-style-type: none"> • Quantify the loss/damage • Organise reconstruction of damaged houses on self help basis with local assets and materials received from the government. • Take up repair/reconstruction work of infrastructure damaged by disaster

>> Department of Health

The department of Health has a responsibility in the reduction and prevention of suffering during natural and man-made disasters.

During emergency department is responsible for prevention and response of natural disasters and man-made disasters, as well as in the investigation and response to outbreak of communicable diseases.

Primary Task
<ul style="list-style-type: none"> • To provide overall medical and health service • Check the spread of epidemics. • To provide Trauma services. • To provide MRHS. • To create awareness.
Non Disaster Time – Preparedness

- Procure Hazard Vulnerability and Risk Map for each District.
- Ensure disaster management plans are developed in health centres and hospitals.
- Ensure that all hospital staff has been informed about the possible disasters in the district, likely damages and effects, and information about ways to protect life, equipment and property.
- Ensure that orientation and training for disaster response plans and procedures are undertaken. Special skills required during disaster situations are imparted to the officials and the staff.
- Ensure adequate availability of Emergency Health Kits in high risk areas
- Train volunteers on emergency preparedness programmes such as first aid and preventive measure against diseases in disaster prone areas.
- Prepare a list of medical and Para-medical personnel in disaster prone areas and make available to DDMA.
- Establish and operate an early warning system for health threats based on the routine health information and in collaboration with other departments.
- Identify likely disease associated with each disaster prepare a health contingency plan keeping in view the threat perception and vulnerability.
- Based on HVR analysis, obtain a list of Response Base from the DDMA office and assign the medical personnel to each of these Response Base to the extent possible. Keep essential medicines and first aid facilities with each Response Base.

- Constitute mobile response units consisting of a doctor, health workers and ANMs and prepare a deployment plan such that each mobile unit is able to cover at least one Response Base in a day.
- Review and update precautionary measures and procedures.
- Review with staff, the precautions that have been taken to maintain and protect equipments.
- Stock emergency medical equipment which may be required in Disaster Management.
- Determine type of injuries/illness expected and drugs and other medical items required and accordingly ensure that extra supplies of medical items are obtained quickly.
- Check stocks of equipment and drugs which are likely to be most needed in disaster management. These can be categorized generally as :
 - Drugs used in treatment of wounds and fractures such as tetanus toxoid analgesics, antibiotics, dressing material and splint.
 - Drug used for treatment of diarrhea, water borne diseases influenza malaria, infective hepatitis.
 - Drug required for treating snake bite and fighting infection
 - Drug needed for detoxication including breathing equipments.
 - Intravenous fluids.

Non Disaster Time – Mitigation

- In coordination with the SEC, conduct building assessments, identification of structural and non structural mitigation activities.
- Prioritize mitigation activities and ensure budget allocation to such mitigation activities.

Alert and Warning Stage

- To prepare and keep ready Mobile Hospitals and stock them with emergency equipment that may be required after the disaster.
- Assess likely health impacts and share with SEOC for planning purpose
- To ensure pre-positioning of Emergency Health Kits and Personnel.
- Direct the activation of health/medical personnel, supplies and equipment as required.

During Disaster

- Designate one liaison Officer to be present at the SEOC.
- Mobilise medical teams and Para-medical personnel to go to the affected areas as part of the Rapid Assessment and Quick Response Teams.
- Provide medical assistance to the affected population
- Carry out technical assessment on health infrastructure availability and need
- Non-ambulatory patients should be relocated to the safest areas within the hospital.
- Dressing pads should be assembled sterilized. A large enough number should be sterilized to last for four to five days.
- Secure medical supplies in adequate quantity for dealing with these situations, which may include:
 - Oral Rehydration Solutions
 - Chlorine Tablets
 - Bleaching Power
 - Anti diarrheal and Anti emetic medicines
 - Intravenous fluids
 - Suture materials
 - Surgical Dressings
 - Splints
 - Plaster rolls
 - Disposable Needle and Syringes
 - Local Antiseptics

- All valuable instruments such as surgical tools, ophthalmoscopes, portable sterilizers, ECG machine, dental equipments, Ultra sound machine, analyzer, computer hardware etc should be packed in protective coverings and stored in rooms considered to be the most damage proof.
- The safest rooms are likely to be :
 - On ground floor.
 - Rooms in the center of the building away from windows.
 - Rooms with concrete ceilings.
- Protect all immovable equipment such as X-ray machines, Sterilizer, Dental chair by covering them with tarpaulins or polythene.
- Ensure adequate supplies of blood in each district.
- Keep one operating facility in each Response Base in readiness. Maintain all the equipment necessary for operations.
- Prepare a maternity facility for pregnant women in every Response Base/ Advance Medical Post.
- All electrical equipment likely to be affected should be marked & unplugged when flood warning is received.
- Check the emergency electrical generator to ensure that it is operational and that buffer stock of fuel exists. If an emergency generator is not available at the hospital, arrange for one.
- Request central warehouse immediately to dispatch supplies likely to be needed in hospitals, on an emergency priority basis.
- Fill hospital water shortage tanks, if no storage tanks exist; water for drinking should be drawn in clean containers and protected.
- Prepare an area of hospital for receiving casualties.
- Develop emergency admission procedures
- Orient field with standards of services, procedures including tagging.

After Disaster

- Determine the extent of loss in educational institutions and prepare plans for their rehabilitation.

Field Office Priorities

- Transport is arranged for transfer of seriously injured/ill patients from villages and peripheral hospital to general hospitals. If roads are blocked helicopter transportation should be ensured.
- Establish health facilities and treatment centers at disaster affected site.
- The provision of medical services will be coordinated by the CMO with District EOC and site operation centers.
- Procedures should be clarified between
 - Health Services of Govt. , Private and other established at transit camps, relief camps and affected site / villages.
 - PHCs
 - CHCs
 - Civil Hospital
 - Private Hospitals
 - Blood Banks
- Maintain check posts and surveillance at railway stations, Bus Stands and all entry and exit points of the affected area, especially during the threat or existence of an epidemic.
- An injury and disease monitoring system should be developed to ensure that a full picture of health risk is maintained. Monitoring should be carried out for portable water and quality of food and disposal of waste in transit and relief camps, feeding centers and affected villages.
- Plan for emergency accommodations for auxiliary staff from outside the area.
- Information formats and monitoring checklist must be used for programme monitoring and development and for reporting to emergency operation center at state level.
- Seek security arrangements from Senior Superintendent of Police to keep curious persons from entering hospital areas and to protect staff from hostile actions.
- Establish a 'Health Helpline' with means of communication to assist in providing the organized source of information. The hospital is responsible for keeping the community informed of its potential and limitations in disaster situations, list of admitted patients and dead persons etc.
- The local police, rescue teams and ambulance teams should be aware of the resources of each hospital.

Checklist:

Sr. No.	Preparedness Measures	Action Taken/ Remarks
1	Prepare a Health Contingency Plan for deployment of health and medical personnel.	
2	Obtain a list of respondent Base from district administration and assign mobile health units and medical staff to each Response Base.	
3	Organize vaccination in Disaster affected area.	
4	Ensure necessary stock of medical supplies and blood.	
5	Organize maternity care centers in every Advance Medical Post.	
6	Keep operative facilities in readiness.	
7	Seek mutual aid arrangement with private hospitals and other dispensaries existing in the area.	

>> Department of Environment, Science and Technology

Non Disaster Time – Preparedness
<ul style="list-style-type: none"> • Develop a disaster management plan for the department. • Designate one Liaison Officer of the department as the Focal Point and inform all concerned. • Establish contact with SASE & IMD for receiving alerts and warnings. • Conduct community capacity building and awareness programs
Non Disaster Time – Mitigation
<ul style="list-style-type: none"> • Develop and upgrade risk assessment and vulnerability analysis at state and district level in GIS format. • Research on avalanche, earthquake and landslide mitigation/technology methods and share them with the State Mitigation task force. • Research on climate change impacts in the State and recommend adaptation strategies. • Vulnerability assessment of the State and GIS mapping
Alert and Warning Stage
<ul style="list-style-type: none"> • Share the findings related to hazard and vulnerabilities studies taken up by the department. • Provide information to all concerned.
During Disaster
<ul style="list-style-type: none"> • Respond within the department as per the department disaster management plan.
After Disaster
<ul style="list-style-type: none"> • Carry out environmental impact assessment of the disaster. • Update risk and vulnerability assessment of the state. • Provide specialised inputs for damage and loss assessment.

>> Department of Forest

Primary Task:
<ul style="list-style-type: none"> • Create provision for permitting grazing in the forest land in the event of disaster when enough fodder is not available. • Extraction and transportation of fodder from forest areas, when the fodder is not freely available. • Provide wooden poles and bamboo for relief and reconstruction at subsidized rate to the inhabitants of affected villages.
Non Disaster Time – preparedness
<ul style="list-style-type: none"> • Prepare a department disaster management plan. • Forest Fire prone areas should be identified and extra vigilance be ensured in such cases. • Organise community awareness programs • Depute one liaison officer within the department, who will be in contact with the SEOC during disasters • Conduct/Procure HRV analysis of Forest resources in the state of Himachal Pradesh. • Based on HRV analysis, prepared district wise Contingency Action Plan of the department. • Create task forces for forest fire fighting. • Draw district specific action plan
Non Disaster time - Mitigation
<ul style="list-style-type: none"> • Prepare and maintain forest lines • Prepare mitigation plan for the department buildings and infrastructure.
Alert and Warning Stage

<ul style="list-style-type: none"> • A rapid response team will be established at division/sub-division level, which will have all tools and equipment readily available. • Information dissemination to the people likely to be affected.
During Disaster
<ul style="list-style-type: none"> • Recall important functionaries from leave: communicate to the staff to man their places of duties like the ward and divisional offices and respective departments. • Call for emergency meeting to take stock of the situation. Develop a strategy and objectives. • Respond within the department as per the department disaster management plan • The liaison officer will coordinate with SEOC for information exchange and also for requirements of resources to and from SEOC • Ensure supply of wood for disposal of dead bodies.
After Disaster
<ul style="list-style-type: none"> • Damage assessment and sharing of reports with SEOC • Ensure plantation of fodder trees to maximum possible extent.

>> Department of Urban Development

Preparedness function
<ul style="list-style-type: none"> • Designate one Liaison Officer in the department as the Disaster Preparedness Focal Point. • Develop a disaster management plan for the department, including the identification of location of camps for different type of disasters, existing locations that can be used as shelters, inventories of agencies that can be used for tent establishment. • To conduct regular training of the staff on minimum standards for shelter, relief camps and tent structures.
Mitigation
<ul style="list-style-type: none"> • Designate one Liaison Officer in the department as focal point for the mitigation activities. • Coordinate with the SDMC members for implementation of mitigation activities in the urban areas. • Prepare and implement department's mitigation plan
Alert and Warning Stage
<ul style="list-style-type: none"> • Locate adequate relief camps based on survey of damage • Quick assessment of functional and stable building structures. • Clear areas for setting up relief camps • In case of damage to offices, assist local authorities to establish and house important telecom equipment and officials at the earliest • Develop alternative arrangements for population living in structures that might be affected after the disaster. • Establish water point in key locations and in relief camps
Response
<ul style="list-style-type: none"> • Quick assessment of damaged areas and areas that can be used for relief camps for the displaced population • Locate relief camps close to open traffic and transport links • Set up relief camps and tents. • Provide adequate and appropriate shelter to the entire population • Coordinate with other ESFs in equipping shelter and relief sites with basic needs of communication and sanitation. • Maintaining provide and procure clean water • Coordinate with SEOC for proper disposal of dead bodies in the urban areas.
Recovery and rehabilitation

- Implement recovery and rehabilitation schemes through municipalities for urban areas.

>> Department of Food, civil supplies and consumer affairs

Primary Tasks:

- To arrange uninterrupted supply of food, essential articles and to meet the requirements of all in affected areas.
- To ensure the supply of POL, LPG.
- To check black marketing and hoardings.

Non Disaster Time – Preparedness

- Develop a disaster management plan for the department and update it half yearly.
- Develop a plan that will ensure timely distribution of food to the affected population.
- Maintain a stock of food relief items for any emergency.
- Identify and delineate vulnerable areas.
- Prepare departmental contingency plan
- Make an inventory of storages & godowns
- Assess and ensure the safety of storage places.
- Constitute district wise/ vulnerable zone wise response teams and delineate roles & responsibilities.
- Estimate the quantity and nature of supplies required district / vulnerable zone wise.

Non Disaster Time – Mitigation

- Prepare and implement department's mitigation plan

Alert and Warning Stage

- Determine the critical need of food for the affected area
- Catalogue available resources of food
- Ensure that food distributed is fit for human consumption
- Ensure quality and control the type of food.
- Allocate food in different packs that can be given to families at household and distributed in relief camps
- Arrange and the transport system in readiness.

During Disaster

- Coordinate with local authorities and other ESFs to determine requirements of food for affected population
- Mobilise and coordinate with other GAD for air dropping of food to affected site.
- Control the quality and quantity of food that is distributed to the affected population.
- Ensure that special care in food distribution is taken for women with infants, pregnant women and children.

After Disaster

- Establishment of PDS points as per the changed scenario/resettlements (If any)
- Issuing of duplicate ration cards to the disaster victims, who lost their papers.

>> Department of Panchayati Raj

<p>Non Disaster Time – Preparedness</p> <ul style="list-style-type: none"> • Develop a disaster management plan for the department and update it annually. • Analyse the training needs of the department's personnel, which include its officials and elected representatives of Gram Panchayat, Panchayat Samitis and Zila Panchayat and organise trainings with the help of HIPA. • Conduct gram Panchayat level mock drills as part of preparedness. • Assist in establishing village disaster management teams.
<p>Non Disaster Time – Mitigation</p> <ul style="list-style-type: none"> • Prepare and implement department's mitigation plan • Ensure that all the developmental schemes have a mitigation component as an integral part.
<p>During Disaster</p> <ul style="list-style-type: none"> • Coordinate with local authorities and support the response efforts. • Coordinate the support from unaffected gram Panchayats.
<p>After Disaster</p> <ul style="list-style-type: none"> • Ensure proper distribution of reconstruction schemes and monitoring of the same through Block development committee and Zila Parishad meetings.

>> Department of Information and Public Relations

The Department has to play a major role in education and awareness programmes for better organized preparedness and response at government and community levels. It also plays a main role to collect reliable information on the status of the disaster and disaster victims for effective coordination of relief work at State level.

<p>Non Disaster Time – Preparedness</p> <ul style="list-style-type: none"> • Develop a disaster management plan for the department. • Designate one Liaison Officer of the department as the Focal Point and inform all concerned. • Conduct education and awareness for local community • Popularize the techniques for preparedness and survival during pre-disaster, disaster and post-disaster period through television, radio and other publicity media. • Ensure strict performance of the allotted duties by radio, television, news media, films and publications related departments. • Take proper and adequate security steps for the protection of own installations and properties. • Prepare guidelines / policy for necessary action by mass media on reporting disasters.
<p>Non Disaster Time – Mitigation</p> <ul style="list-style-type: none"> • Prepare and implement department's mitigation plan • Prepare and implement public awareness on mitigation activities.
<p>Alert and Warning Stage</p> <ul style="list-style-type: none"> • Acquire accurate scientific information from the nodal departments • Flash warning signals on all TV and radio networks. Disseminate information to all victims in the affected area • Curb the spread of rumours. • Caution the victims about the do's and don'ts during a disaster.
<p>During Disaster :</p>

- Coordinate with the EOCs for required information for relief workers.
- Provide information of emergency numbers and other key contact numbers on television, through newspapers, loudspeakers and radio networks.
- Send news flashes of latest updates / donation requirements for disaster area.
- Ensure that the news to be broadcasted reflects the true and clear presentation of the actual position and does not create panic in the minds of the people and also advises them to desist from taking unreasonable steps.
- Take steps for publicity of news and directives relating to the situation issued by the SDMA.
- Curtail normal programmes to broadcast essential information on disaster if requested by the EOC.
- Arrange visit to the affected area by the local and foreign journalists in the interest of publication of accurate and true report in the news.
- Help victims as well as emergency workers in providing information regarding hospitals, help desks.
- Inform unaffected population about hospitals where they can find victims and where assistance is required.

After Disaster

- Arrange dissemination of information of the short and long term measures of different departments/agencies for relief and rehabilitation of the affected people.

>> Department of Power

Primary Task

- Ensure uninterrupted power supply in the disaster prone area
- Coordination & mobilize the resources with private power developers in different basins.
- Protect the infrastructure against impending threats.

Non Disaster Time – Preparedness

- Designate one Liaison Officer of the department as the Focal Point and inform all concerned.
- Develop a disaster management plan for the department.
- Carry out survey of condition of all power supply at state and district level.
- Conduct HRV analysis for HPSEB installation & implementation in the state.
- Based on HRV analysis, prepare Contingency Action Plan of HPSEB.
- Establish radio communication of key functionaries with State Emergency Operation Center, District Control Room and with Boards and Departments.
- Review and update precautionary measures and procedure and review with staff the precautions that have been taken to protect equipment.
- Ensure that alternate power supply arrangements for emergency supply are available for critical facilities such as:
 - Secretariat Building at State & District level
 - Hospitals
 - IPH installations
 - State EOC/DEOC
 - Police Stations
 - Telecommunication buildings
 - Meteorological stations
 - Dc Office/BP Office
 - Any other place if required
- Check whether emergency tool kits are properly assembled and if any additional equipment needed.
- Protect Power Stations from disaster. Raise the height of compound walls.

Non Disaster Time – Mitigation

- Designate one Officer as nodal officer for mitigation activities...
- In coordination with the SEC, conduct building assessments, identification of structural and non structural mitigation activities.

Alert and Warning Stage

- Establish radio communications with the SEOC.
- Prepare a First assessment report in conjunction with other ESFs for the SEOC to take further decision.
- Check emergency toolkits.
- Keep alternate power supply systems and generators in state of preparedness.
- Immediately undertake inspection of
 - High tension lines
 - Towers
 - Sub-stations
 - Transformers
 - Insulators
 - Poles and
 - Other equipments

During Disaster – Response

- Establish contact with the SEOC.
- Assist authorities to reinstate generators for public facilities such as Hospital, water supply, police stations, telecommunication building and meteorological stations.
- Dispatch emergency repair teams equipped with tools, tents and food.
- Establish temporary electricity supplies for relief material warehouses.
- Instruct district staff to disconnect the main electricity supply for the affected area.
- Provide accurate & regular information to the people about the state of power supply.
- Call for emergency meeting to take stock of the situation. Develop a strategy and objectives.
- Establish temporary electric supplies to transit camps feeding centers, relief camps and Site Operation Center, District EOC and on access roads to the same.
- Assist hospital in establishing an emergency supply by assembling generators and other emergency equipment if necessary.
- Establish temporary electric supplies to other key public facilities, public water system etc, to support emergency if necessary.

After Disaster – Recovery and Rehabilitation :

To facilitate restoration of energy systems after a natural /manmade disaster

- Review total extent o damage to power supply installations.
- Take steps to ensure speedy repair and restoration of power supply installations
- Begin repair/reconstruction.
- Compile an itemized assessment of damage from reports made by various electrical receiving centers and sub-centers.
- Report all activities to the head office and EOC at state and district level.

>> Department of Mining and Industries

Non Disaster Time

- Designate one Liaison Officer in the department as the Disaster Management Focal Point.
- Ensure all possible steps for the security of manpower, implements, stock, installations/factories etc.
- Prepare listing and locations of industries and establishments for possible sourcing of relief material during disasters.
- Ensure training on preparedness programmes to be adopted at different levels for all manpower employed in factories and establishments in disaster vulnerable areas.

- Promote the preparation of implementation of emergency preparedness plans by all industrial units
- Implementing the existing laws for preventing environmental disaster in chemical industry or industries emitting toxic gases and effluents.
- Issue detailed instructions to the employees about their duties and responsibilities in precautionary, disaster and post-disaster stages of normal disaster.
- Arrange regular training for mining employees and contractors in the disaster prone areas on disaster issues.

Alert and Warning Stage

- Evacuation of the mineworkers from the mines and factories on the receipt of early warning.

During Disaster

- Request industries to provide emergency relief material such as food products, temporary shelter, medicines and medical equipment and search and rescue equipment.

After Disaster

- Take steps to plan for rehabilitation of industries adversely affected by disasters.

>> Department of Labour & Employment

Non Disaster Time

- Designate a liaison officer as a focal point and inform all concerned.
- Issue disaster management guidelines to all the industries and ensure on-site and off-site plans for all industries.
- Prepare and disseminate guidelines for the labour security and safety.
- Prepare and implement rules and regulations for industrial safety and hazardous waste management.
- Prepare and disseminate public awareness material related to chemical accidents.

During Disaster

- Provide labour to other departments for relief supply and distribution.
- Provide skilled labour for maintenance of equipment and tools.
- Help in establishment of camps.
- Ensure minimum wages to labour during relief work in drought or other disasters.

After Disaster

- Take appropriate steps to provide labour assistance to concerned ministries in reconstruction and rehabilitation programmes.
- Assist in employment generation and alternate livelihoods for affected populations.

>> Department of Finance

Beside normal duties, the department of finance will perform the following responsibilities:

Non Disaster Time

- Designate one Liaison Officer in the department as the Disaster Management Focal Point.
- Arrange for the necessary funds as per decision of the State Government

During Disaster

- Ensure quick allocation of funds for meeting relief operations.
- Control all accounts under the responsibility of the Government
- Start mobilizing resources for construction of infrastructure, public facilities and structures required for recovery.

After Disaster

- To monitor international loans and aid assistance to the state.
- To allocate and monitor government plan expenditure towards relief and rehabilitation of Disaster affected areas.

6.7 The Emergency Support Functions

Disaster response is a multi-agency function. The Department of Revenue is the Lead or Primary Agency which will be responsible for managing and coordinating the response while other agencies will support and provide assistance in managing the incident. These ESFs will form integral part of the Emergency Operation Centres (EOCs) and each ESF would coordinate its activities from the allocated EOC. Extension teams and workers of each ESF will be required to coordinate the response procedures at the disaster affected site. ESF Plan of the State is placed at Annexure – VIII.

6.8 Alert Mechanism – Early Warning System

In most disaster situations, the experience has shown that loss of life and property could be significantly reduced if preparedness measures are taken and appropriate warning systems are put in place. With respect to every disaster the following procedure will be used to issue warning and alerts:

- The District Disaster Management Authority will be the prime agency responsible for issuing the disaster warning at the district level and similarly at state level the State Executive Committee will be the prime agency.
- Technical State agencies authorized to liaison with national agency will receive warning and also communicate the same to the District Emergency Operation Center and State Emergency Operation Centre for further dissemination.
- Agencies responsible to issue the warnings are as follows:

Hazards	Agencies (National Level)	Agencies (State Level)
Drought	Department of Agriculture	Department of Agriculture
Floods	Central Water Commission	Department of IPH
Snow avalanches	Snow and Avalanche Study Establishment (SASE), Manali (DRDO)	Department of Environment Science & Technology
Human Epidemics	Ministry of Health	State Department of Health
Animal Epidemics	Ministry of Animal Husbandry	Animal Husbandry
Road Accidents	MHA	State Department of Home
Industrial and Chemical Accidents	Ministry of Industry,	Department of labour and employment
Fires	MHA	Department of Home (Fire), Department of forest
Hot and Cold waves	Indian Meteorological Department	Department of Revenue

During non disaster time, the SEC will ensure that the following activities are being carried out in coordination with the concerned line departments:

Pre-Disaster Warning and Alerts

For any information received on likelihood of disasters the SEC shall carry out the following activities:

- Activate the SEOC
- Based on early warning received, prepare initial information report with estimation of likely severity and scale of disaster.
- The ESF will be asked to conduct a review of the preparedness level of the districts likely to be affected by the disaster, by calling a meeting of District DMCs (Disaster Management Committees).
- Prepare a team for deployment to assess damage and need.
- Inform respective departments to activate respective SOPs
- Inform the recognized national and international organizations if necessary.
- Provide appropriate warning to general public.
- Coordinate with district authorities on dissemination of warning to general public and if necessary, carry out evacuation.
- Request Home Department to be on standby for rescue and relief operations.
- If required, declare de-warning

6.9 Relief and Rehabilitation

In the aftermath of disasters the affected people must be looked after for their safety, security and the well being and provided food, water, shelter, clothing, medical care etc. so as to ensure that the affected people live with dignity.

Guiding Principle of this phase would be "To build back better"

The Department of Revenue through SEOC will coordinate the recovery and rehabilitation activities in the disaster affected areas under the aegis of SEC by undertaking the following activities.

- Declaration of end of Disaster Situation by the SEC under the directions of SDMA.
- Submission of the recovery and rehabilitation plan by the SEC as per the disaster specific emergent situational needs, to SDMA.
- Declaration of Compensation, which will be done by Department Of Revenue under the directions of the State Government as per relief manual.
- Declaration of Rehabilitation Schemes by the SDMA under the directions of the State Government.
- Coordination with respective departments for implementation of rehabilitation programme
- Pooling of resources including external loans and funds if required.
- Implementation of the recovery and rehabilitation activities in the affected villages through existing mechanism and lesson learnt under the administration control DDMA.
- Documentation of the disaster based on experiences and lesson learnt of all the involved departments/agencies by DDMA and submission of the report to the SEC for review and revision of the State Disaster Management Plans based on the report findings.

6.9.1 Food and Nutrition:

People during disaster situation normally experience shortage of food. In order to ensure adequate availability to sustain life the following measures shall be taken:

1. Free distributions of food shall be made to those who need the food most.
2. The food distribution will be discontinued as soon as the situation comes to normal.
3. Preferably dry rations shall be provided for home cooking.
4. Community Kitchen for mass feeding shall be organized for an initial period following a major disaster and in situation where affected people do not have the means to cook.
5. While providing food assistance, local food habits and preferences shall be kept in mind.
6. Foods provided shall be of good quality, safe to consume, appropriate and acceptable to recipients.
7. Rations for general food distributions shall be adopted to bridge the gap between the affected population requirements and their own food resources

8. Food shall be stored, prepared and consumed in a safe and appropriate manner at both household and community levels.
9. Food shall be distributed in a responsive, transparent, equitable manner.
10. Local voluntary groups, NGOs and other social organizations shall be involved for supplementing the efforts of the Government.
11. The nutritional needs of the population shall be ensured.

6.9.2 Water:

Water supply is invariably affected in natural disasters. Availability of Safe drinking water becomes doubtful particularly in hydro-meteorological disasters.

The following measures shall be taken by the State Governments/ district administration:

1. The IPH Department shall identify alternative sources of water and make necessary arrangements for supply to the affected population.
2. The IPH Department shall ensure that affected people have adequate facilities and supplies to collect, store and use sufficient quantities of water for drinking, cooking and personal hygiene.
3. Drinking water supplied shall conform to the prescribed quality standards for domestic consumption.

6.9.3 Health:

During post disaster phase many factors increase the risk of diseases and epidemics. These include poverty, insecurity, overcrowding, inadequate quantity and quality of water, poor environmental and sanitary conditions, inadequate shelter and food supply.

6.9.4 Medical Response:

Medical response has to be quick and effective. The execution of medical response plans and deployment of medical resources warrant special attention at the State and District level in most of the situations. The following measures shall be taken by the Department of Health & Family welfare:

1. A mechanism for quick identification of factors affecting the health of the affected people shall be established for surveillance and reporting.
2. An assessment of the health and nutritional status of the affected population shall be done by medical teams to be constituted by CMOs of each district.
3. The deployment of the nearest medical resources to the disaster site, irrespective of the administrative boundaries shall be ensured by CMOs.
4. Ensuring the availability of adequate supply of medicines, disinfectants etc.
5. Protocol for inoculation shall be developed.
6. Vaccination of the children & pregnant women shall be undertaken.
7. Vector control measures shall be undertaken.
8. To prevent outbreak of water borne diseases appropriate measures shall be taken.

6.9.5 Mental Health Services:

Disasters cause tremendous mental trauma to the survivors. Psycho-social support and mental health services would be made available immediately in the aftermath of disaster so as to reduce the stress and trauma of the affected community and facilitate speedy recovery. The following measures shall be undertaken by department of Health & Family welfare:

1. A Nodal Mental Health Officer shall be designated for each affected District.
2. Rapid needs assessment of psycho-social support shall be carried out by the Nodal Officer/ Health Department.
3. Trained man power for psycho-social and mental health services shall be mobilized and

deputed for psycho-social first aid and transfer of critically ill persons to referral hospitals.

4. Psycho-social first aid shall be given to the affected community/ population by the trained community level workers and relief and rescue workers.
5. Psycho-social first aid givers shall be sensitized to local, cultural, traditional and ethical values and practices.
6. Psycho-social support and mental health Services shall be arranged in relief camps set-up in the post disaster phase.
7. In case of large number of disaster victims psycho-social support through a referral system for long term treatment shall be followed.
8. The services of NGOs and CBOs shall be requisitioned for providing psycho-social support and mental health services to the survivors of his disasters
9. Community practices such as mass prayers; religious discourse etc. will be organized in addition to medical support.

6.9.6 Clothing and Utensils:

During disasters, people lose their clothing and utensils. The following measures shall be taken by DDMA:

1. The people affected by the disaster shall be provided with sufficient clothing as per the weather to ensure their dignity, safety and well-being.
2. Each disaster-affected household shall be provided with cooking and eating utensils.

6.9.7 Shelter:

In a major disaster a large number of people are rendered homeless. In such situations shelter becomes a critical factor for survival of the affected people in the initial stages of a disaster. Further, shelter becomes essential for safety and security and for protection from the adverse climatic conditions. Shelter is also important for human dignity and for sustaining family and community life in difficult circumstances. The following measures shall be taken while providing shelter to the affected people:

1. Disaster affected people who have lost their dwelling units or where such units have been rendered damaged/useless shall be provided sufficient covered space for shelter.
2. Disaster affected households shall be provided access to appropriate means of artificial lighting to ensure personal security.
3. Disaster-affected households shall be provided with necessary tools, equipment and materials for repair, reconstruction and maintenance for safe use of their shelter.
4. Shelter shall be chosen by taking into consideration the geographical terrain and weather conditions of the affected area.
5. Different parts of the state have specific shelter requirements which can withstand and severe weather conditions. For instance a simple tent may not work during winter season and hence providing of winterized tents or creation of temporary shelters would be required.
6. Provision will be made for keeping the shelter warm during winter season.

6.9.8 Relief Camp:

The following steps shall be taken for setting up relief camps in the affected areas:

1. Adequate numbers of buildings or open space shall be available where relief camps can be set up during emergency.
2. The use of premises of educational institutions for setting up relief camps shall be bare minimum.
3. One member of the Incident Command Team from the district trained pool will manage the relief camps.
4. The requirements for operation of relief camps will be worked out in detail by each DDMA.
5. Agencies to supply the necessary stores will be short listed in the pre-disaster phase.

6. The temporary relief sites will have adequate provision of water for drinking and bathing, sanitation and essential health-care facilities.
7. Adequate security arrangements shall be made by the local police
8. Adequate lighting arrangements shall be made in the Camp Area including at water points, toilets and other common areas.
9. Special task forces from amongst the disaster affected families will be constituted for managing community kitchens.
10. The victims will be issued identification cards and if required bank accounts for cash transfers etc.

Chapter VII – Partnership with other Stakeholders

The academic scientific and technical organizations which have an important function in DM and early warning to recovery are as follows:-

7.1 Academic Institutions

- State Council of Education, Research and Training (SCERT), Solan
- Govt. College for Teacher Education, Dharamshala
- HP Board of School Education, Dharamshala
- HPKV, Palampur
- YS Parmar University of Horticulture & Forestry, Nauni Solan
- IIT Roorkee
- IIT Mandi
- Guru Nanak Dev University, Amritsar
- Himachal Pradesh University, Summer Hill, Shimla
- National Institute of Technology, Hamirpur

7.2 Involvement of communities in Disaster Management

The following institutions can play an effective role in DM:

- PRIs
- Schools
- Market associations
- Hotel associations
- Industry Association
- Power Project Association
- Religious Groups

DDMAs shall:

- Prepare inventory of all research and academic institutions, NGOs and other stakeholders located in each district.
- Facilitate their membership within the technical committee(s)
- Establish Partnerships with line departments and external stakeholders
- Coordinate periodic meetings
- Support NGOs for community mobilization

7.3 Indian Meteorological Department (IMD)

India Meteorological Department (IMD) monitors meteorological information and continuously communicates with disaster managers for disaster preparedness. Meteorological Center at Shimla in Himachal Pradesh is functioning since 2002. The Shimla Meteorological Centre has meteorological observatory, aviation, meteorological station and seismological observatory. The office issues weather forecast and severe weather warnings. The station at Shimla is equipped with Digital Met Data Dissemination (DMDD) High Speed Data Terminal (HSDT) and a 256 Kbps data circuit for transmission and reception of meteorological data, Interactive Voice Responsive System (IVRS) etc. The state through its Nodal departments shall establish fool proof linkage for sharing real time & online information.

7.4 Meteorological network in Himachal Pradesh



Figure 7.1 Indian Meteorological Department’s Observational Network in Himachal Pradesh

S. No. Surface Observatories		Number
1	Departmental	06
2	Part Time	10
3	Rain Gauges	70
4	Others (SASE, CWC, etc.)	10
S. No. Upper Air Observatories		Number
1	RS / RW	1 (Under SASE)
2	PBO	1
S. No. Automated Weather Stations		Number
1	AWS	19
2	Agro-AWS	09
3	ARS	01
4	ARG	85
<i>(28 already installed. Installation of rest of ARG is still pending)</i>		

7.5 Central Water Commission (CWC)

The Central Water Commission (CWC) provides flood forecasting and warning. The flood forecasting network of the CWC covers all the major flood-prone inter-state river basins in the country. Flood forecasting and warning system is used for alerting the likely damage and enables the people to move and also to remove the moveable property to safer places. In the State of Himachal Pradesh the CWC has set up a Directorate at Shimla for monitoring of floods. CWC has established flood forecasting network in the Satluj basin at Titang, Powari, Nathpa, Rampur and Pandoh. CWC has also established two telemetry based automatic gauge station along the Parechu river. The Directorate at Shimla is also engaged in Snow hydrological studies and with the help of NRSC Hyderabad is forecasting snowmelt run off in Satluj, Yamuna, Beas and Chenab basins in the state. Daily gauge & discharge data is collected manually and from two telemetric location along Parechu river is transmitted to Shimla station through VSAT arrangement and is further disseminated by email/fax during flood season.

7.6 Bureau of Indian Standards (BIS)

The Bureau of Indian Standards (BIS) provides standards for construction in seismic zones, popularly known as Building Codes. The building construction in urban and suburban areas is regulated by the Town and Country Planning Acts and Building Regulations.

7.7 Role of NGOs

The Non-governmental Organizations (NGOs) are the most effective means of achieving an efficient communication link between the disaster management agencies and the affected community. There are different types of NGOs working at the advocacy as well as the grass roots levels in the state. In disaster situations, they could be of help in preparedness, relief and rescue, rehabilitation and reconstruction, and also in monitoring and feedback.

7.7.1 NGOs with Dedicated field Operations and Resource Backup:

These are large organizations, such as the International Red Cross Society. They have specific areas in which they carry out field operations. They have access to a large resource base, and have the capability to extend material, financial as well as technical support to disaster-affected sites. In emergencies, their role is critical in garnering support and resources from all over the world and come to the rescue of the affected population almost immediately.

7.7.2 Interest Group/Voluntary Groups:

These are also NGOs, which are multi-purpose in nature having varied interests, such as the Rotary Club and Lion Club. Such interest groups are very active help to disaster victims in the times of need. They could also play a major role in resource mobilization for relief aid and rehabilitation purpose.

7.7.3 Association of Local Occupation groups:

Such association are formed on the basis of common occupational backgrounds, and could include groups such as doctors' association, traders' association and Army wives' associations, officers & employees association etc. such groups, just like other interest groups, could play a major role in resource mobilization, and provision of specialized services to the victims in any emergency situation.

7.8 Atal Bihari Vajpayee Institute of Mountaineering & Allied Sports (ABVIMAS)

Located at Manali, ABVIMAS is the largest adventure sports training institute in the country. It organizes basic & advance training courses in trekking, mountaineering and skiing. During disaster

situation the institute could play an important role in evacuation rescue operations in high altitude areas and could act as State Nodal Institution for such operations

7.9 Geological Survey of India

Geological Survey of India located at Chandigarh is responsible for coordinating and understanding geological studies for landslide hazard mitigation and for carrying out landslide hazard zonation, monitoring landslides and avalanches and studying the factors responsible for sliding and suggesting precautionary and preventive measures.

7.10 Building Material & Technology Promotion Council (BMPTC)

As part of Ministry of Housing & Urban Poverty Alleviation BMPTC is knowledge and demonstration hub for providing simple solutions aimed at common man in the field of sustainable building materials, appropriate and disaster resistant construction.

7.11 Forums of the Hydro Power Producers in Satluj, Beas and Chenab Basins

On account of large hydropower potential in the State the forums of Hydro Power Producers in each basin can catalyse the pooling of resources and in developing and implementing effective flood forecasting and disaster management systems. For mutual benefits the members of the forum would share their experience and best practice in tackling events like flash floods & cloud bursts. DDMA will establish formal linkage with all such associations.

7.12 Bhakra Beas Management Board (BBMB)

Bhakra Beas Management Board is an important stakeholder as it regulates the supply of Satluj, Ravi, Beas water to the states of Punjab, Rajasthan, Delhi & Chandigarh. The Board has an elaborate network of observatories in the catchments of the mandated river basins and regularly collects data which can help in forecasting & forewarning of hydro meteorological disaster. The Board has its office at Sundernagar in district Mandi which can be contacted in the events of hazards such as breach in hydro channel collapse in transmission tower etc.

7.13 Snow and Avalanche Study Establishment (SASE)

Centre for Snow and Avalanche Study Establishment (SASE) is a laboratory of the Defence Research & Development Organisation (DRDO) located near Manali. SASE is the nodal agency for providing avalanche forecasting and alerts. The establishment is also responsible for undertaking research in the field of Snow and Avalanches and suggest avalanche control measures to combat the hazards associated with snow.

7.14 Wadia Institute of Himalayan Geology (WIHG)

WIHG is an autonomous Institute of department of S&T Govt. Of India located at Dehradun. The institute carries out basic research in Himalayan Geodynamic evolution and Seismo-tectonics. The institute is operating the Seismic Observatory Array at Naddi-Dharamshala.

7.15 Local Residents' Associations

These Residents' Welfare Associations (RWAs) are formed by the local residents to look into the interests of those living in their area. These associations are extremely concerned about the welfare of the local community. They could also act as a very useful tool for getting across the message of community participation at the ground level and mobilization of rescue and relief operations at grass root level.

7.16 Religious Bodies

Religious bodies such as Radha Swami are one of the most important NGO groups that come to the immediate rescue and relief of the disaster victims. These bodies have a large and dedicated following in their communities. They also have control over the local places of worship, which are usually built on high and safe ground, and can serve as ideal shelters for the disaster victims. Besides, they often have infrastructure and resources to feed mass gathering, which facilitate disaster relief work. District-wise inventory of all such facilities shall be prepared by respective DDMA.

7.17 Educational Institutions

The education institutions such as schools and colleges play an important role in disaster management. Their prime responsibility is to spread awareness on natural disasters, provide preventive action needed to minimize damage due to disasters as well as ensure immediate relief and rescue. Besides, these institutions have large buildings at local level, which could be used as shelters for the victims in the times of disaster.

NGOs can facilitate the process of disaster management by contributing towards:

- i) **Communication with Community**
NGOs have better links with the community and presence in the field which puts them in a better position to assess, decide and implement relief operations at the time of a disaster.
- ii) **Human Resources**
The human resources of NGO's are generally very prompt and motivated, as they comprise volunteers involved at their own initiative and moreover the NGOs are not handicapped due to procedural problems.
- iii) **Finance and Materials**
NGOs have very flexible means of mobilizing resources.
- iv) **Professional and Technical Services**
A number of specialized technical services can be made available to the community by the NGOs, which would otherwise be too expensive and inaccessible to the common folk.

7.18 Indian Red Cross Society

In India, we have Red Cross Society at the national, state and district levels. This is not just an agency, but also a movement for providing relief to the people when they are in dire need of it. Being apolitical organization it is the image of the Red Cross that makes, it one of the most acceptable institutions in the area of providing relief to the people in distress. Effective linkage will be developed with the Red Cross through Himachal Unit located at Shimla.

7.19 Media

The role of the electronic media during recent times has emerged as a major component of disaster management. This role has been amply demonstrated in the aftermath of disasters be it the Gujarat earthquake of 2001 or the Muzzafarabad Earthquake of 2005. At the same time, the role of the print media, especially regional press needs to be given due recognition, as this continues to be the only medium accessible to a large section of people in many parts of society, which still remains unreachable by the electronic media. Besides, it is also true that the print media has a major role to play in pre-disaster prevention, mitigation and preparedness activities through generation of appropriate community awareness.

7.20 Industrial Associations

In the state of Himachal, the following industrial associations are very active:

- Parwanoo Industries Association, Parwanoo
- Pharmaceutical Manufacture's Association, Kala-Amb
- Baddi Barotiwala & Nalagarh (BBN) Association

The potential in terms of man and machinery available with the industry can be effectively utilized in protecting the industrial areas as well as in mounting Disaster Management Response and Recovery in the event of any disaster.

Chapter VIII - Financial Arrangements

8.1 The Approach

With change of paradigm shift in DM from the relief-centric to proactive approach of prevention, mitigation, capacity building, preparedness, response, evacuation, rescue, relief, rehabilitation and reconstruction, effort would be made to mainstream and integrate disaster risk reduction and emergency response in development process, plans and programmes of the Government at all levels. This would be done by involving all the stakeholders- Government Organizations, research and academic institutions, private sector, industries, Civil Society Organization and community. SDMA and DDMA will 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. Due weightage will be given to these factors while allocating resources. Projects which help in reducing the existing vulnerability of the area would be given preference over projects which are likely to enhance it.

8.2 Responsibilities of the State Departments and Agencies

All State Government Departments, Boards, Corporations, PRIs and ULBS will prepare their DM plans including the financial projections to support these plans. The necessary financial allocations will be made as part of their annual budgetary allocations, and ongoing programmes. They will also identify mitigation projects and project them for funding in consultation with the SDMA/DDMA to the appropriate funding agency. The guidelines issued by the NDMA vis-a-vis various disasters may be consulted while preparing mitigation projects.

8.3 Thirteenth Finance Commission

The Thirteenth Finance Commission allotted grant to the state during the fiscal cycle of 2010-15 for taking up “activities for building capacity in the administrative machinery for better handling of disaster risk response and for preparation of District and State level Disaster Management Plans (DMPS) as envisaged in the Disaster Management Act(2005). NCCF merged into the NDR Fund and the CRF into the SDR Fund of the respective States.

As per Commission’s recommendation, the contribution to the SDR Fund should be shared between the Centre and States in the ratio of 75:25 for general category States and 90:10 for special category States And the provisions relating to the Disaster Management (DM) Act may be reviewed and setting up of these funds left to the discretion of the individual States.

8.4 By State Government

As Stated in the section (48) of the DM Act 2005, the State Government shall establish for the purposes of the Act the following funds:

- a) **State Disaster Response Fund:**
This fund will be constituted and made available to the SEC for meeting the expenses for emergency response, relief and rehabilitation.
- b) **District Disaster Response fund:**
This fund will be constituted and made available to the District Disaster Management Authority for meeting the expenses for emergency response, relief and rehabilitation.
- c) **State Disaster Mitigation Fund:**
This fund will be constituted and made available to the SEC for meeting the expenses on mitigation activities.
- d) **District Disaster Mitigation Fund:**

This fund will be constituted and made available to the District Disaster Management Authority for meeting the expenses on mitigation activities.

8.5 By Ministries and Departments of Government of India and State Government

As per the section (49) of the Disaster Management Act, 2005, the every ministry or department of government of India and the state government shall make provisions in their annual budget for carrying out the activities and programs set out in their disaster management plans. The planning department will be advised to mark 0.5% of budget allocation for meeting the disaster management requirement.

8.6 Techno-Financial Regime

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 will be considered for adoption.

Chapter IX - Recovery Plan

Once the response process is in place the recovery process is activated by resorting to the following actions:

- Providing and erecting temporary housing to the victims and displaced persons.
- Facilitating and providing claims and grants as per the relief manual.
- Providing counseling to the victims
- Providing and facilitating medical support for the victims requiring long term care.
- Clearing and disposing off the debris created as a result of collapse of physical infrastructure and elements.
- Initiating the process of reconstruction by adapting improvised technologies for safe construction.

9.1 Reconstruction and Resettlement

The approach to the reconstruction process will be aimed at converting adversity into opportunity. Incorporating disaster resilient features to **'build back better'** will be the guiding principal. This phase requires the most patient and painstaking effort by all concerned. The choice of technology will be based on its likely impact on physical, social-cultural or economic environment of the communities in the affected areas or in their neighborhood. Systems for providing psycho-social support and trauma counseling need to be developed for implementation during the reconstruction and recovery phase.

Owner Driven Construction:

Reconstruction plans and designing of houses will be a participatory process involving the government, affected community, NGO's and the corporate sector. After the planning process is over, owner driven construction will be preferred. Reconstruction programmes will be within the confines and the specification as laid down by the government. Essential services, social infrastructure and intermediate shelters/camps will be established in the shortest possible time. For permanent reconstruction, the work including the construction of houses will be completed within two to three years. Dedicated project teams will be constituted to speed up the reconstruction process.

Rehabilitation and Reconstruction:

In the rehabilitation phase:

- Provision of emergency relief will be provided by mobilizing human and material resources on a war footing. It would comprise food, temporary shelters and other basic requirements.
- Rehabilitation of all the displaced people, restoration of basic and alternative means of livelihood; and
- Initiation of long-term sustainable community-based actions and development interventions will be carried out on priority.

The rehabilitation would comprise housing and infrastructure, economic and social rehabilitation besides psychological rehabilitation. For housing rehabilitation, the existing inhabited settlements may be completely reconstructed at a new site for which, if required, land acquisition will be done. Housing rehabilitation would also be carried out by way of up gradation of existing damaged houses through repairs and retrofits. Infrastructure such as roads, water supply, sewerage, school, health centres will be rehabilitated on priority.

Chapter X - GO-NGO Coordination

10.1 Institutional and Legal Framework

The DM Act 2005 recognizes that sometimes the development patterns that do not recognize disaster risk and vulnerability in the specific geographic areas may induce disasters. The proactive approach in the DM Act 2005 to address disaster risk and vulnerability through pre-disaster preparedness and mitigation activities also envisions accountability and multi stakeholder participation, including coordination of the activities of the NGOs at various levels. Sections 30 (2) (xix) of the Act mandates the DDMA for collaboration with stakeholder agencies including NGOs for the purpose of improving the effectiveness of DM. Similarly the Act mandates NGOs to act in an equitable and non-discriminatory manner for the purpose of assisting or protecting the disaster affected communities or for providing relief to the affected communities or while dealing with any effects of threatening disaster situations and has fixed the responsibility to monitor this on DDMA's vide section 34 (I). The above provisions ensure that the concerned DM interventions being addressed are supported and facilitated by the civil society organizations working at the grass roots and also takes care of the ground realities.

Section 30 (2) (xix) of the Act stipulates that the DDMA shall "advise, assist and coordinate the activities of the Departments of the Government at the district level, statutory bodies and other governmental and non-governmental organizations in the district engaged in the disaster management" and Section 24 (I) lays down that the DDMA shall "ensure that the non-governmental organizations carry out their activities in an equitable and non-discriminatory manner". The Act also directs the State Government under Section 38 (2) (a) to coordinate "actions of different departments of the Government of the State, the State Authority, District Authorities, local authority and other non-governmental organizations".

Sections 35 and 38 specifically emphasize the coordination of actions with NGOs. The National Policy on Disaster Management (NPDM) also states the national vision for community mobilization and participation in DM and aims to provide momentum and sustenance through the collective efforts of all government agencies and NGOs. There is emphasis on community based disaster management, including last mile integration of the policy, plans and execution and early warning dissemination. Promoting a productive partnership with NGOs is a prominent thrust area in the NPDM.

There is a large scope for improving the engagement of NGOs in DM and on efficiently utilizing their unique advantages and core competencies by strengthening humanitarian coalitions, alliances and NGO networks. There is also need to strengthen public awareness, capacity building and knowledge management through CBOs and NGOs. Institutional mechanisms for the advocacy and engagement of NGOs with government agencies on DM concerns require to be strengthened. Replication and scaling up of community level good practices has to be promoted.

10.2 Advantages of Involving NGOs

- i. NGOs can play a very important role in mobilising communities and in linking PRIs/ULBs with corporate sector entities for initiating DRR related activities.
- ii. The strong linkages which NGOs have with grassroots communities can be effectively harnessed for creating greater public awareness on disaster risk and vulnerability, initiating appropriate strategies for strengthening the capacity of stakeholder groups to improve disaster preparedness, mitigation and improving the emergency response capacities of the stakeholders.
- iii. In addressing the emerging concerns of climate change adaptation and mitigation, NGOs can play a very significant role in working with local communities and introducing innovative approaches based on the good practices followed in other countries.
- iv. NGOs can bring in the financial resources from bi-lateral and multilateral donors for implementing pragmatic and innovative approaches to deal with disaster risk and

vulnerability, by effectively integrating and converging the various government programmes, schemes and projects to create the required synergy in transforming the lives of at-risk communities.

10.3 Actions to be taken by the DDMA

- i. Developing a database of NGOs, CBOs and Faith Based Organizations at all levels working in the field of disaster management and emergency response and other others focusing on geographic outreach and thematic capacities of the organizations.
- ii. Developing the capacity of identified NGOs, CBOs and organizations in disaster management and emergency response.
- iii. Constitution of Inter-Agency Group (IAG) for the district with an objective to:
 - Promote and institutionalize unified response strategy in humanitarian crisis.
 - Mainstreaming the emergency preparedness as in integrated development strategy.
 - Systematize the emergency response mechanism.
 - Bringing in the culture of “working together” in emergencies and normalcy.
 - Engagement in activities that will build the capacities of stakeholders and local communities to cope with calamities.
- iv. Development of Criteria for membership of IAG: Any of the following criteria is proposed to become a member of the District IAG:
 - District Level agencies working in emergency response and preparedness for minimum of five years.
 - International and national funding agencies supporting emergency preparedness and community led risk reduction initiatives for a minimum period of three years.
 - Academic and /or research institutions actively involved on disaster related knowledge management and practices.

Membership claim may be scrutinized by a committee of the District IAG for authentication of the prospective member organization.

Action Points

No.	Issues	Action Points
1.	Geographic spread of NGOs	Develop a database of NGOs at all levels working on disaster management focusing on geographic outreach and thematic capacities of the organizations. (Action: DDMA with the help of NGOs)
2.	Volume of support provided by NGOs	Compile statistics on quantum of support provided by NGOs at all levels, both international and national. (Action: DDMA)
4.	Coordination	Establishing inter agency mechanisms for coordination and networking activities (information and knowledge management, training and capacity building, collaborative advocacy, quality and accountability) at all levels. (Action: DDMA)
5.	Accessibility	Establish protocols for cooperation and ensure access to the affected areas with support from government agencies at respective levels like NDRF and SDRF that have good logistics base to reach inaccessible areas. (Action: DDMA, NGOs, CBOs)
6.	Hazard and vulnerability based planning	Conduct community centric hazard and vulnerability analysis at all levels, and develop disaster management plans in accordance. (Action: DDMA, NGOs)

7.	Community participation	Ensure community participation in assessment, planning, implementation and monitoring of activities at all levels. (Action: DDMA, NGOs, CBOs)
8.	Mainstreaming of Disability Issues in DM	Support the most vulnerable groups through mitigation activities as well as disaster preparedness and response, with a particular focus on the special needs of the Persons with Disabilities (PWDs). (Action: DDMA, NGOs)
9.	Gender Mainstreaming	Make women's as well as men's concerns and experiences an integral dimension in the design, implementation, monitoring and evaluation of policies and programs such that inequalities between men and women are not perpetuated through the routine operations of DM. (Action: DDMA)
10.	Focus on most vulnerable rather than only on Epicenter	National level: Advocate with all actors to reach out to gap areas State level: Coordinate among actors to identify gap Areas District and Local level: Ensure targeting with equity and outreach to all excluded areas. (Action: District NGO Task Forces in DM)
11.	Rural-urban diversity	Develop the capacities of NGOs or specialized civil society agencies at all levels to manage urban as well as rural disasters and accordingly make investments. (Action: DDMA)
12.	Adherence to standards	National level: Develop minimum standards for India State level: Develop minimum standards for the state District and Local level: Develop capacities for adherence to minimum standards through collective and coordinated efforts of all stakeholders (Action: DDMA, NGOs, CBOs)
13.	Transparency and accountability	Develop an agreed framework of accountability for all levels and mechanisms to bring in transparency. (Action: DDMA)
14.	Do No Harm	Advocacy at all levels on Do No Harm through disaster response and development interventions. (Action: District NGO Task Forces in DM)
15.	Exit strategy	Ensure that the NGO programmes have an exit strategy to link with long term recovery/rehab/development programs of other NGOs or the government. (Action: District NGO Task Forces in DM)

(Source: NDMA Guidelines on the Role of NGOs in Disaster Management)

10.4 Coordination of Actions of Other Actors

Disasters affect all aspect of human life and all aspects of development. Therefore, Disaster Management is a multi-agency function. It involves actions by all departments, organization and agencies. In short, it involves all departments of the State Government, Central Government, Armed Forces, civil society and commercial organization (NGOS, CBOs, Faith Based Organization, Traders Organizations, Corporate Sector), international organizations working in the field of disaster response, UN Agencies etc. It is therefore, important that roles and responsibilities of each stakeholder is laid down during normal time and coordination mechanism worked out so that the same works during emergencies. It is must that regular meetings with all the stakeholders are held at least once in six months or a year. And all stakeholders are also associated in the mock drills to test their preparedness and clarity of roles and responsibility.

Chapter XI - Knowledge Management

11.1 Approach

There is a need to create a network of knowledge institutions in the field of DM, to share their experiences and knowledge. The DDMA would forge ties with knowledge institutions such as NITs, IITs, CBRI, SASE, ICIMOD, GSI, CWC, IMD, Wadia Institute of Himalayan Geology Dehradun, etc., and UN Agencies and other national and international agencies dealing with emergency response will be done to utilize their experience and knowledge for DM in the district.

In acknowledgment of the need for a knowledge sharing platform on DM, and to facilitate interaction and dialogue with related areas of expertise, the DDMA website within the district website would be created. It will connect all Government Departments, statutory agencies, research organizations/institutions and humanitarian organizations to share collectively and individually their knowledge and technical expertise. ICT would be utilized to disseminate knowledge to the stakeholder so that they can benefit from it.

11.2 Documentation of Best Practices

The indigenous technical knowledge would be documented and promoted. And in the immediate aftermath of any disaster or incident, field studies will be carried out, with the help of experts wherever needed, as an institutional measure. These studies will concentrate on identifying gaps in the existing prevention and mitigation measures and also evaluate the status of preparedness and response. Similarly, the lessons of past disasters will also be compiled and documented. The recovery and reconstruction process will also be analyzed for further refining the DM processes and training needs.

**PART II:
DISASTER SPECIFIC RESPONSE PLANS**

Chapter XII – Disaster-specific Response Plans

The Himachal State Disaster Management Plan has a 'multi-hazard approach' and incorporates various actions in the form of 'Trigger Mechanism', which in essence are the Standard Operating Procedure (SOP). SOP's has been envisaged as a preparedness plan whereby the receipt of alert or warning of a disaster or on occurrence of a sudden disaster without warning, would simultaneously activate all response and relief activities by all the government departments and other agencies without loss of crucial time. Activities such as evacuation, search and rescue, temporary shelter, food, drinking water, clothing, health and sanitation, communication, accessibility and public information are important components of post disaster management, which would follow on the activation of Trigger mechanism. These activities are common to all types of disasters and will require the preparation of detailed action plans/ CMPs by each specified primary agency/authority /Stakeholders.

Nodal Ministries at Union Level

Ministries Responsible for Various Categories of Disasters:

DISASTERS	MINISTRIES/DEPARTMENTS
Earthquakes and Tsunami	MHA/Ministry of Earth Sciences/IMD
Floods	MHA/Ministry of Water Resources/CWC
Cyclones	MHA/Ministry of Earth Sciences/IMD
Drought	Ministry of Agriculture
Biological Disasters	Ministry of Health and Family Welfare
Chemical Disasters	Ministry of Environment & Forests
Nuclear Disasters	Ministry of Atomic Energy
Air Accidents	Ministry of Civil Aviation
Railway Accidents	Ministry of Railways

The Nodal Department at State level, which will be responsible for preparing the Hazard specific Crisis Management Plans, are as follows:

Type of Hazard	Primary Agency/Department	Supporting Agencies / Departments
Water And Climate Related Disasters		
1. Floods	Department of I and PH	IMD, CWC, ES&T
2. Hailstorm	Department of Agriculture and Horticulture	IMD, Home, insurance and Revenue
3. Cloud Burst	Department of I and PH	IMD, CWC, ES&T, Revenue
4. Heat Wave and Cold Wave	Department of Revenue	IMD, ADMN, forest, Health
5. Snow Avalanches	Snow and Avalanche Study Establishment (SASE), Manali (DRDO)/Department of Home/ES&T	Tribal Admin, IMD, Health, Home and Revenue, Mountaineering Institute/S&T/GSI
6. Droughts	Department of Agriculture/IPH	IMD, Revenue, RD, Nauri and

		Palampur Universities/ Department of Land records
7. Thunder and Lightning	Department of Revenue	IMD/ES&T
Geologically Related Disasters		
8. Landslides and Mudflows	Geological Wing of Department of Industries, PWD, BRO and UD	GSI,CRRI, Ministry of Earth Sciences, Wadia Institute of Geology, Wadia Institute of Himalayan Geology
9. Earthquakes	Department of Environment, Science and Technology	IMD, Ministry of Earth Sciences/GSI
10. Dam Failures/ Dam Bursts	Department of MPP and Power	IPH
Chemical, Industrial And Nuclear		
11. Chemical and Industrial Disasters	Department of industries/ Department of labour and employment	HPSEB, Department Of labour & employment, Home, Admn, DMI Bhopal, and NDRF
12. Nuclear Disasters	Department of Home	DEST, Admn, Central Ministry of Atomic Energy and Defence
Accident Related Disasters		
13. Forest Fires	Forest Department	Fire Department, ES&T,Home and Admn
14. Urban Fires	Department of Home(Fire)	IPH, Health,TCPI, Admn and Home
15. Major Building Collapse	Department of UD	PWD,Health,Home and Admn
16. Serial Bomb Blasts	Department of Home	Admn, Health and Family Welfare
17. Festival related disasters	Department of Home	Admn, Health and Family Welfare/Department of Art language and culture
18. Electrical Disasters and Fires	HPSEB/ MPP and Power	Home, Health and Revenue
19. Air, Road and Rail Accidents	Department of Transport, Indian Railway and Civil Aviation/GAD	Home, Health and Family welfare and Admn/Revenue
20. Boat Capsizing	MPP and Power/IPH	BBMB, Home, Health and Family Welfare and Admn.
21. Village Fire	Department of Home	Home, Revenue, Health and Family Welfare
Biologically Related Disasters		
22. Biological Disasters and Epidemics	Department of Health	Home, Revenue and NDRF
23. Pest Attacks	Department of Agriculture and Horticulture	Home, Revenue. and NDRF
24. Cattle Epidemics	Department of Animal Husbandry	Home, Revenue. and NDRF
25. Food Poisoning	Department of Health	Home, Revenue and NDRF

EARTHQUAKE-SPECIFIC RESPONSE PLAN

Levels of earthquakes:

With the help of firsthand information or disaster communication system and remote sensing satellite information, the disasters have to be categorized into either of the following four levels.

- **L0 level disaster:**

This is a no disaster situation i.e. normal times when the disaster management system should be maintaining a close watch over the state of preparedness. Mock drills at various levels have to be undertaken to check the preparedness. Earthquakes of magnitude less than 5.0 may occur. Earthquakes of magnitude less than 5.0 and almost no area affected (generally non-damaging) and do not require much attention. However, effort should be made at local level to find out damage/loss if any and to take appropriate actions. This is the most important period for disaster prevention, preparedness and mitigation when these activities are taken up actively.

- **L1 level disaster:**

The L1 level disaster is designated when earthquakes of magnitude greater than 5.0 and less than 6.0 occur. When reported from any quarter, necessary actions are set into action, without formal orders from anywhere, some basic initial management response steps alerting all concerned according to a predetermined procedure. Generally district administration should be able to manage earthquake disaster of this level.

- **L2 level disaster:**

The L2 level disaster is designated when earthquakes of magnitude greater than 6.0 and less than 6.7 occur. This should entail triggering off some basic initial management response steps, which would be set into motion without formal orders from any quarters. The mitigation, relief and rescue operations would swing into action simultaneously. The State Government is likely to be involved in relief and response measures.

- **L3 level disaster:**

The L3 level disaster is designated when earthquakes of magnitude greater than 6.7 occur. Large scale deaths and destruction is likely to take place. The assistance of Central Government, its Agencies, NDRF and Armed Forces may be required to deal with the situation.

Measures to be taken in Case of L2 and L3 Earthquake Disaster by the State Government

Real Time Information on Earthquake

The IMD has been designated to monitor seismic activity in and around the country and notify the user agencies including the State Governments about the magnitude and epicenter of the earthquake as soon as it occurs. The I/C State and district EOCs can also obtain information about occurrence of earthquake either directly contacting the IMD office or checking up with IMD website.

Impact Assessment

- EOCs/Control Rooms at the State, District and Sub-division and Tehsil Level would be activated fully and response mechanism as per ESF Plan would be put into motion automatically on the basis of information on the magnitude and epicenter of the earthquake.
- State/District Administration will gather information regarding the deaths, injuries and damages to the buildings/infrastructures.
- State Government, if need be, will conduct an aerial survey to determine the scope of the damage, casualties, and the status of key facilities.

- iv) State Government/District Administration will identify areas and assess the requirement of NDRF teams for urban search and rescue operations. The priority of conducting these operations will be established by the DDMA.
- v) The Deputy Commissioner (s) will send FIR as per SOPs to the State EOC and State EOCs would send consolidated FIR to the NEOC.

Deployment of Search and Rescue Teams

- i) As an immediate measure District Administration would deploy local SAR teams of Civil Defence/Home Guards, Police, Local Volunteers etc.
- ii) Requirement of Armed Forces – Army, Air Force, CPMFs, NDRF etc. would be worked out by the respective DDMA and requisitioning placed by the DM or the SRC/State Government as the case may be.
- iii) The ESF Department/District Administration shall arrange for local transportation (from airport/railway station to affected site) of NDRF teams and supplies POL etc. for their equipment/vehicles of NDRF.
- iv) District and local authorities shall control traffic to ensure that NDRF teams/other SAR and relief teams could reach the earthquake affected areas without delay.
- v) ESF Department/District Administration shall provide access routes for transportation of NDRF, other SAR and Relief Teams to the affected sites. If need be, roads and bridges will be repaired or reinforced even on a temporary basis or emergency detours be provided.
- vi) State Government in consultation with DG NDRF/JS, DM Division, MHA, shall make arrangement for deployment of USAR Teams from foreign countries to districts.

Emergency Medical Relief

- i) The Department of Health and Family Welfare and Ayurveda would activate their respective emergency medical plan forthwith.
- ii) NDRF teams are also trained in Emergency Medical Services (EMS) such as Medical First Response techniques with basic knowledge of life saving of disaster victims Each NDRF battalion has 9 Doctors and 90 paramedics. NDRF teams shall provide EMS to the areas of their deployment during post disaster phase.
- iii) Ministry of Defence would be requested to provide QRMTs, mobile field hospitals, ARMVs and Heli-ambulances. They will be activated to reach the earthquake affected areas immediately along with dressing material, splints, portable X-ray machines, mobile operation theatres, resuscitation equipment and life-saving drugs, etc.
- iv) The Department of Health and Family Welfare at the State Level would coordinate with its counterpart at the national level for medical assistance required for the State.

Supply of Relief Materials to affected States

- i) The DDMA would assess requirement of relief items and material required for the affected areas. It would also project its demand to the State Government.
- ii) The ESF departments both at the district and state level would arrange to supply relief material to the affected locations.
- iii) The Revenue Department at the State level would consolidate demands received from the districts and would coordinate with Central Relief Commissioner for central assistance, if any.
- iv) The DDMA/districts would appoint Nodal Officers at airports/helipads to coordinate receipt and channelization of relief material. Adequate arrangement would be made the transportation of relief material to different parts of the district.
- v) A mechanism would be put in place for proper accounting for and distribution of the relief material received in the district.

Establishment and Running of Relief Camps

- i) District administration would establish relief camps as per requirement.
- ii) ESF departments would arrangement for all basic amenities in these camps.
- iii) These relief camps would be run and managed by the PRIs and ULBs.

- iv) Temporary shelters would be constructed as per requirement by the PWD, HIMUDA, UD and the RD.

Repair and Restoration of Roads, Communication, Electricity and Water Supply

- i) The Public Works Department would undertake repair, build temporary bridges, access ways and other temporary structures for restoration of National and State Highways and other roads.
- ii) The PWD would also repair damaged helipads and make temporary helipads as per requirement.
- iii) Communication network would invariably be damaged in an earthquake. The BSNL and other service providers would take immediate steps to restore communication in the affected areas. Secondary ESF departments/agencies for communication would also provide communication facilities for disaster communication and relief.
- iv) NDRF, if called, would be requested to set-up mobile communication facility at the site so that rescue and relief operations are conducted smoothly.
- v) HP SEB Limited would take immediate steps for restoration of electricity supply to the affected areas.
- vi) The I & PH Department would restore water supply to the affected areas and would also ensure supply of water through other means till water supply is not fully restored through pipelines.

Earthquake Damage Assessment of Public Building and Infrastructure and Individual Houses

- i) All Departments would constitute teams of officers/technical persons to:
 - Inspect buildings and structures that are critical to emergency services operations and mass care activities. Designate those that may be occupied and identify/mark those that are unsafe.
 - Inspect buildings and structures that may threaten safety. Identify/mark those that are unsafe and may not be occupied.
 - Inspect less critical damaged structures. Designate those that may be occupied and identify/mark those that are unsafe to occupy.
- ii) District Administration shall constitute teams of qualified technical personnel for damage assessment of individual houses. These teams shall also identify/certify those houses that are unsafe and may not be occupied.
- iii) The State Government in consultation with the IITs and NITs develop guidelines for assessment of damaged individual housing units.
- iv) The State Government in consultation with the IITs/NITs develop guidelines for repair/retrofitting of earthquake damages housing units.
- v) Criteria for damage and usability classification of houses would be as per the table given hereunder:

Indicative Criteria for damage and usability classification of buildings					
Damage & usability category	Usability category	Damage state	Damage degree	Damage description	Note
I	Usable	None: Slight non-structural damage, very isolated or negligible structural damage	1	Non visible damage to structural elements. Possible appearance of fine cracks in the wall and ceiling mortar. Non-structural and structural damage barely visible.	Buildings classified as damage degree 1 and 2 are without decreased seismic capacity and do not pose a danger to human life. These buildings are

			2	Cracks in the wall and ceiling mortar. Displacement of large patches of mortar from wall and ceiling surfaces. Considerable cracks, or partial failure of chimneys, attics and gable walls. Disturbance, partial sliding, sliding or collapse of roof covering. Cracks in structural elements such as columns, beams and reinforced-concrete walls.	immediately usable, or usable after removal of local hazards such as cracked chimneys, attics and gable walls.
II	Temporarily unusable	Severe: Extensive non-structural damage considerable structural damage yet repairable structural system.	3	Diagonal or other cracks in supporting walls, walls between windows and similar structural elements. Large cracks in reinforced structural elements such as columns, beams and reinforced concrete walls. Partially failed or failed chimneys, attics or gable walls. Disturbance, sliding and collapse of roof covering.	Buildings classified as damage degree 3 and 4 are of significantly decreased seismic capacity. Limited entry to the building is permitted, and it is usable before repair and strengthening. The needs for supporting and protection of the building and its surroundings should be considered.
			4	Large cracks with or without detachment of walls, with crushed material from walls and similar elements of structural walls. Large cracks with small dislocation of reinforced-concrete structural elements columns, beams and walls. Slight dislocation of structural elements and the whole building.	
III	Unusable	Total: destroyed or partially or totally collapse	5	Structural elements and their connections are extremely damaged and dislocated. Large number of	Buildings classified as damage degree 5 are <i>unsafe and risk sudden collapse</i> . Entry is prohibited.

		structural system.		crushed structural elements. Considerable dislocation of the entire building and roof structure. Partially or completely failed buildings.	Protection of streets and neighboring buildings or urgent demolition is required. Decision on demolition should be based on an economic study that considers repair and strengthening as one of the possible alternatives.
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Information Management and Helpline

- i) State Government/District Administration shall set up Emergency Information Centre (EIC) at the SEOC/DEOCs level or other suitable location for release of consolidated information to all stakeholders including Media at the State/District Level.
- ii) Helpline would be established at SEOC/DEOCs or other suitable location for providing information about victims to the next of kin, friends and others.
- iii) EIC shall maintain all records and document of all major actions taken in managing the incident.

Prevention of Human Trafficking of Widows/Orphans

The Department of Women Empowerment and Child Development shall set-up monitoring and coordination mechanism in the affected area for prevention of human trafficking of women and children.

Identification and Disposal of Dead Bodies

The Home Department shall deploy forensic teams and equipment for DNA Fingerprinting of victims in mass casualty cases. The Department would also coordinate with MHA for central assistance as per requirement. While disposing of unclaimed/unidentified dead bodies NDMA Guidelines shall be followed.

Psycho-social Support

- i) The Health and Family Welfare Department shall arrange to provide psycho-social support to the victims of disaster and train volunteers for this job.
- ii) The Health and Family Welfare Department shall assess the requirement of central assistance for providing psycho-social support to the victims.

Financial Assistance to the Victims of Disaster

- i) The victims/dependants of victims shall be provided disaster relief assistance as per the HP DM and Relief Manual, 2012 and as per additional assistance guidelines issued by the Government in such cases.
- ii) The damage and needs assessment carried out by the State Government shall be sent to the Central Government for seeking grants under NDRF or Prime Minister's Relief Fund.

The damage and needs assessment carried out by the District administration shall be sent to the State Government for seeking grants under SDRF or Chief Minister's Relief Fund.

EARTHQUAKE DISASTER RESPONSE: STANDARD OPERATING PROCEDURES

Real Time Information on Earthquake received from IMD to Emergency Operation Centre

Impact Assessment

Deployment of Search and Rescue Teams

Emergency Medical Relief

Supply of Relief Materials to affected Districts

Establishment and Running of Relief Camps

Repair and Restoration of Roads, Communication, Electricity and Water Supply

Earthquake Damage Assessment of Public Building and Infrastructure and Individual Houses

Information Management and Helpline

Identification and Disposal of Dead Bodies

Prevention of Human Trafficking of Widows/Children

Financial Assistance to the Victims of Disaster

LANDSLIDE-SPECIFIC RESPONSE PLAN

Likely impacts of landslides:

➤ Primary Impacts

- Multiple injuries and deaths;
- Impact on hydroelectric and multi-purpose projects;
- Extensive damage to roads and highways;
- Major road closures;
- Damage to habitations leading to relocation of population and establishments;
- Loss of cultivable lands;
- Adverse effect on environment; and
- Creation of artificial lakes.

➤ Secondary Impact

Landslide may result in blocking courses of relatively large natural drainages with or without the formation of artificial lakes. Such artificial lakes created due to landslides may result in flooding upstream and downstream.

Measures to be taken in Case of a major Landslide

Real Time Information on Landslide and Impact Assessment

- i) The GSI, the Nodal Agency, shall monitor landslides for identified sites and notify about the impending landslide to all the user agencies and departments of the state and district administration.
- ii) Earthquakes may trigger landslides and therefore, IMD shall communicate the occurrence of an earthquake magnitude and epicenter of the earthquake to GSI for initial assessment of earthquake induced landslide.
- iii) PWD, BRO, Forest Department shall notify the State/District EOC about the occurrence of the landslide along with preliminary information on location, magnitude, damage caused, etc. The State EOC shall notify the NEOC and GSI if the magnitude of the landslide is huge and the assistance of the central agencies is required.

Landslide Response Planning

- i. The DEOC/Sub-Division control room will establish contact with the site and obtain information regarding deaths, injuries, damages to building/infrastructure, environment etc. and communicate the same to all designated/ESF departments/authorities for appropriate action.
- ii. District/local administration shall mobilize local SAR teams and further identify areas and assess the requirement of SDRF/NDRF teams for urban search and rescue operations. The priority for conducting these operations shall be established by the district administration.
- iii. The DM shall also send FIR to the State EOC and requisition for NDRF and other state/central resources. The SRC shall also coordinate and follow up with the Central Government for its assistance and resources, if so required.

Deployment of Search and Rescue (SAR) Teams of NDRF, Army, etc.

- i. The NDRF, Army etc. if requisitioned by the district will be deployed for search and rescue operations as per assessment of the situation.
- ii. The BRO by virtue of its capabilities and location will also be deployed for SAR operations in the affected area.
- iii. The district administration shall arrange for transport (from railway station or airport) of NDRF teams and supply POL etc. for equipment, vehicles of NDRF.
- iv. DM/SRC will also coordinate with JS MHA (DM Division) for deployment of Army, if required.

Emergency Logistics

- i. Specialized heavy earthmoving and SAR equipment will be required immediately after a landslide to clear debris and carry out search and rescue operations of trapped people in huge masses of debris.
- ii. The PWD will immediately move its machinery and men to the locations.
- iii. The equipment available with CPWD, power projects, and private sector would also be mobilized as per requirement.
- iv. SRC will coordinate with JS (DM), MHA for mobilization of earthmoving equipment from SAIL, BEML etc. to the effected site, if need be.

Emergency Medical Relief

- i. The CMO/Department of Health and Family Welfare will dispatch a team of medical specialists to the affected site with medicines etc. and prepare the nearest hospital for receiving the victims. 108 medical response will be activated too.
- ii. NDRF teams are also trained in Emergency Medical Services (EMS) such as Medical First Response techniques with basic knowledge of life saving of disaster victims Each NDRF battalion has 9 Doctors and 90 paramedics. NDRF teams, if deployed, shall provide EMS to the areas of their deployment during post disaster phase.
- iii. The Department of Health and Family Welfare at the State Level would coordinate with its counterpart at the national level for medical assistance required for the State.

Repair and Restoration of Road, Power, Water and Telecommunication etc.

- i. The PWD will repair and restore the affected roads immediately. The department may take assistance of secondary ESF agencies, if need be.
- ii. The damaged water supply, electricity and telecommunication lines will be restored by the respective departments forthwith.

Other Measures

- i. Environment Impact Assessment: Department of Environment and Forest will get the environment impact assessment carried out for the affected area.
- ii. Technical Assistance: The GSI will be requested to provide trained professionals, technical experts to state Government for geo-technical studies and remedial measures for stabilization of slopes.
- iii. Monitoring of Artificial Lakes: The NRSC/ISRO/HP State Council of Environment, Science and Technology/CWC shall monitor through application of space technology and provide information regarding formation of any artificial lakes, if any, due to landslide in higher/inaccessible reaches.

LANDSLIDE DISASTER RESPONSE: STANDARD OPERATING PROCEDURES

IMD/Geological Survey of India issues alerts

Disseminate landslide alert received from GSI/IMD to
Emergency operation Centre

Alert citizens through SMS, Media, website in case of
heavy landslide

Monitor Landslide and watch for flooding

Issue early warning to ward if Heavy Landslide occurs

Deployment of SAR Teams

Emergency Logistics

Emergency Medical Relief

Repair of Lifelines

Environment Impact Assessment

Monitor Lake Artificial Lakes

FLASH-FLOOD SPECIFIC RESPONSE PLAN

Likely impacts of flash floods:

- Extensive damage to structure
- Multiple injuries and deaths
- Major road closures
- Damage to public utilities – power, water, telecom etc.
- Loss of land

Case Scenarios:

Two case studies of flash floods and GLOF in Himachal are given below which can be considered as worst case scenario for flood/flash flood disaster response.

- i) **31st July and 1st August 2000 in Satluj Valley:** Increase in water level of Satluj up to 60 feet above the normal level. The flash flood was termed as the one that occurs once in 61,000 years. Widespread damage in the valley right from its confluence with Spiti river near Khab to downstream areas. Extensive damage to 200 Km of NH-22, washed away 20 bridges, 22 Jhulas and badly damaged 12 bridges. About 1000 irrigation, sewerage, flood protection and water supply schemes were badly damaged. 135 people and 1673 cattle lost their lives. The total estimated loss was to the tune of Rs. 1466.26 crore.
- ii) **Parechoo Lake Outburst, 2005**
 - Flash flood in Satluj river due to breach in the Pareechu lake in Tibetan catchment on 26th June 2005.
 - Washed away the NH-22 at a number of places, 10 bridges, 11 ropeways washed away, 15 motor able bridges and 8 jeep able and footbridges damaged/affected, 10 Km stretch of NH-22 between Wangtoo and Samdo was washed away, and various link roads were damaged.
 - Total loss estimated to the government as well as public property was some Rs. 610 crore.

Measures to be taken in Case of a Flash Flood

Early Warning (EW) and Preparedness

- i) Central Water Commission (CWC) is the nodal agency for issuing alerts and forecasts about the floods. The CWC has also installed EWS in the River Sutlej and has been issuing daily bulletins on water level in the river. The IMD office Shimla issues weather forecasts (heavy rains etc.) on daily basis. The EW agencies would send alerts as per the SOPs prepared at the State and National level.
- ii) National Remote Sensing Agency (NRSC) also monitors landslides and blockages of rivers which may cause flooding. Tie up with the NRSC Hyderabad would be made by CWC once there is any information of blockade of river and threat of floods. The local administration would be kept updated on the situation.
- iii) The HP State Council for Science, Technology and Environment will also monitor the potential dangerous lakes and keep the State Government abreast of any dangerous situation. The council shall also assist districts in assessing the severity of submergence due to release of excess water downstream the dams.
- iv) The State/district EOCs shall keep the public updated about the forecasts on heavy rains and early warning alerts on floods through electronic and other means.

Flood Response Planning and Impact Assessment

- i) EOCs/Control Rooms at State, district and local level shall be fully activated and response/ESF mechanism put into motion.
- ii) The district authorities will assess the impact of damage and organize response mobilizing the local teams. The DM will also place requirement for state assistance. Requisitioning for NDRF or CPMFs/Army will also be done under intimation to the State Government.
- iii) The State Government, if need be, will conduct an aerial survey to determine the scope of damage, casualties, and the status of key facilities.
- iv) District administration will identify areas and assess the requirement of NDRF teams for SAR operations. The priority for conducting these operations will be established by the District Administration.
- v) District administration shall arrange for local transportation (from airport/railway station to the affected area) of NDRF teams and supplies of POL etc. for equipment/vehicles of the NDRF.
- vi) The DM will send FIR to the State EOC.
- vii) SRC will coordinate with JS (DM), MHA for central assistance and deployment of Army/Air Force including helicopters for SAR and relief operations.

Emergency Medical Relief

- i. The CMO/Department of Health and Family Welfare will dispatch a team of medical specialists to the affected site with medicines etc. and prepare the nearest hospital for receiving the victims. 108 medical response will be activated too.
- ii. NDRF teams are also trained in Emergency Medical Services (EMS) such as Medical First Response techniques with basic knowledge of life saving of disaster victims Each NDRF battalion has 9 Doctors and 90 paramedics. NDRF teams, if deployed, shall provide EMS to the areas of their deployment during post disaster phase.
- iii. The Department of Health and Family Welfare at the State Level would coordinate with its counterpart at the national level for medical assistance required for the State.

Supply of Relief Material to the affected Areas

- i) DDMA will assess requirement of relief material for the affected and mobilize the local reserves. It will also place its requirement for relief material with the SRC. It will also assess demand for helicopter for relief distribution, if the access through road is cut off.
- ii) In case of deployment of helicopter for relief, a senior officer of the DA will be appointed as nodal officer to coordinate with the Air Force/Helicopter authorities.
- iii) Provision of temporary shelter will be made for those whose houses have been affected/damaged.

Repair and Restoration of Road, Power, Water and Telecommunication etc.

- i. The PWD will repair and restore the affected roads immediately. The department may take assistance of secondary ESF agencies, if need be.
- ii. The damaged water supply, electricity and telecommunication lines will be restored by the respective departments forthwith.

Other Measures

- i. Environment Impact Assessment: Department of Environment and Forest will get the environment impact assessment carried out for the affected area.
- ii. Safety Assessment of Dams: The CWC shall deploy structural engineers/experts for safety assessment of dams wherever necessary.

FLASH-FLOODS DISASTER RESPONSE: STANDARD OPERATING PROCEDURES

Disseminate rain forecast received from IMD to
Emergency Operation Centre

Alert citizens through SMS, Media, Website in case of
heavy to very heavy rainfall

Monitor rainfall on AWS

Issue early warning to ward if rainfall exceeds 10mm in 15
minutes

Flood Response Planning and Impact Assessment

Supply of Relief Material to the affected Areas

Repair and Restoration of Road, Power, Water and
Telecommunication etc.

Deploy anti flooding teams in uniform at flooding sites

Coordinate with other stakeholders as per requirement

SNOW-AVALANCHE SPECIFIC RESPONSE PLAN

Avalanches constitute major hazards in the higher reaches of Himalayas. Parts of Himalayas which receives snow fall round the year and avalanche spots are in abundant. Avalanches occur in winter soon after the snow mainly in Lahaul & Spiti, Kinnaur and Pangi areas of the State.

Key features of avalanche hazard are:-

- More common in elevation of more than 3500 meter.
- More frequent in slopes of 30-45 degree.
- Convex slopes are more prone to this sort of disaster.
- North facing slopes have avalanche in winter and south facing during summer.
- Slopes covered with grass are also more prone to this hazard

Avalanche reach speeds of up to 200 km/hour and can exert forces great enough to destroy structures coming in their way and snap off large trees.

Case Scenario

In March, 1979, 237 people were killed in Lahaul and Spiti due to avalanche, which is the worst avalanche disaster in the State. Occurrence of such incidents in future cannot be ruled out.

Likely Impacts of Snow-avalanche:

- Extensive damage to the forests and vegetation
- Extensive damage to roads and highways
- Multiple injuries and deaths
- Damage to habitations leading to relocation of population and establishments
- Loss of cultivable land and
- Adverse effect on environment

Measures to be taken in Case of a Snow-avalanche

Real Time information on Avalanche

BRO and SASE (the nodal Agency for Snow Avalanche) will:

- i. Monitor the area of Himachal to forewarn the civil population of impending avalanche danger.
- ii. Notify about impending avalanche to all the user agencies including State EOC, and district EOC.
- iii. Earthquake may trigger avalanches and therefore, IMD shall communicate the occurrence of an earthquake to SASE for initial assessment of earthquake induced avalanches.
- iv. BRO, PWD, Forest Department shall notify about occurrence of the avalanches along with preliminary information on location, magnitude, damage caused, etc. to the State and district EOC.

Impact Assessment

- i. District Administration shall gather information about the deaths, injuries and damages to buildings/infrastructure.
- ii. State Government, if the need be, will conduct an aerial survey to determine the scope of the damage, casualties, and the status of key facilities.
- iii. District Administration will mobilize local response and will identify areas and assess the requirement of NDRF teams for urban search and rescue operations.
- iv. The DM will send FIR to the State EOC and State EOC shall send consolidated report to the NEOC.

- v. The services of ISRO/ HP State Council for Environment, Science and Technology will be taken to assess the extent of damage caused by avalanche.

Deployment of SAR Teams

- i. BRO shall be primarily involved in SAR operations by virtue of their capabilities and locations across the landslide prone areas in the State.
- ii. The PWD will also deploy its men and machinery for debris clearance.
- iii. SDRF/NDRF shall be requisitioned and deployed by the DM as per requirement.
- iv. District administration shall arrange for local transportation (from airport/railway station to the affected area) of NDRF teams and supplies of POL etc. for equipment/vehicles of the NDRF.
- v. SRC shall coordinate with JS (DM), MHA for further coordination with the IDS, HQ, MOD for deployment of Army, if required.

Emergency Logistics

- i. Specialized heavy earthmoving and SAR equipment will be required immediately after an avalanche to clear debris and carry out SAR operations of trapped people in huge masses of debris. DM shall coordinate with BRO, NHPC, PWD and other power projects for mobilizing of earthmoving equipment.
- ii. SRC shall coordinate with JS (DM), MHA for further coordination with the MOD, SAIL, BEML etc. for mobilizing of earthmoving equipment and provide the same for the affected area, if required

Emergency Medical Relief

Chief Medical Officer of the affected district shall:

- i. Assess the needs of emergency medical relief;
- ii. Constitute and deploy specialized medical team to handle orthopedic, and surgery related injuries including anesthetists, radiologists etc.;
- iii. Supply medicines, disinfectants, etc. as per demand of the affected area.
- iv. In worst cases of avalanches, MOD will be requested to provide QRMTs duly equipped for the affected area.

Supply of Relief Material to the affected Areas

- i. DDMA will assess requirement of relief material for the affected and mobilise the local reserves. It will also place its requirement for relief material with the SRC. It will also assess demand for helicopter for relief distribution, if the access through road is cut off.
- ii. In case of deployment of helicopter for relief, a senior officer of the DA will be appointed as nodal officer to coordinate with the Air Force/Helicopter authorities.
- iii. Provision of temporary shelter will be made for those whose houses have been affected/damaged.

Repair and Restoration of Road, Power, Water and Telecommunication etc.

- i. The PWD will repair and restore the affected roads immediately. The department may take assistance of secondary ESF agencies, if need be.
- ii. The damaged water supply, electricity and telecommunication lines will be restored by the respective departments forthwith.

Environment Impact Assessment

Department of Environment and Forest will get the environment impact assessment carried out for the affected area.

FLASH-FLOODS DISASTER RESPONSE: STANDARD OPERATING PROCEDURES

IMD/SASE/BRO issues alerts to EOC

Disseminate Snow avalanche alert received from SASE/IMD/BRO to Emergency operation Centre

Alert citizens through SMS, Media, website in case of Snow avalanche

Monitor Snow Avalanche

Impact Assessment in case of occurrence of Avalanche

Deployment of SAR Teams – Local
Coordination for deployment of NDRF and Army if need be

Emergency logistics for disaster response

Emergency Medical Relief

Supply of relief material to the affected areas

Repair and restoration of Lifelines and EIA

**PART III:
CROSS CUTTING ISSUES**

Chapter XIII - Review and Updation of Plan

The State Disaster Management Plan is a “living document” and the SEC will update it every year taking into consideration:

- The resource requirements
- Updates on human resources
- Technology to be used
- Coordination issues

The following guidelines would be adhered to while updating the State Disaster Management Plan:

- Technical committee constituted by SEC will update the plan on an annual basis to ensure that the items requiring updating are considered and are current. This will involve:
- Submission of annually updated disaster management plans by all the DDMA's to SEC by 1st January every year.
- Copies of the received updated plans from the districts will be given to the State-level Technical committees, for review and suggestions.
- Final annual meeting will be organized by the SEC by 15th Feb every year which will be participated by SEC members, Technical Committee members and all chairpersons of the district DDMA's.
- The updated plan will be placed before SDMA for approval by 31st March every year.
- When an amendment is made to a plan, the amendment date would be noted on the updated page of the plan.
- Copies of the amendments made and approved by the SDMA will be circulated to all the concerned government departments and agencies.

All the disaster management nodal/liaison officials in every department/agency will ensure that all plan-holders are notified of changes as soon as possible.

Chapter XIV - Coordination and Implementation

Dissemination of the Plan

The primary responsibility for dissemination of plan will be with the SEC. The SEC would also involve state-level Training Institute HIPA and NGOs in awareness campaigns. The State DM Plan will be disseminated at three levels:

- State line departments and defence services.
- District authorities, government departments, NGOs and other agencies and institutions within the state and
- PRI & through mass media to the general public.

The content of the plan would be explained through well designed and focused awareness programmes. The awareness programmes would be prepared in the local language to ensure widespread dissemination.

Media would be extensively used for public awareness programs. These will include

- newspapers
- TV
- local cable networks
- radio
- publicity material

Schools, colleges and other public institutions would be specifically targeted.

Plan Evaluation

The purpose of evaluation of the state plan is to determine

- the adequacy of resources
- coordination between various agencies
- community participation
- partnership with NGOs

The plan will be updated when shortcomings are observed in

- organizational structures
- available technology
- response mechanism following reports on drills or exercises;

Post-Disaster Evaluation

A post-disaster evaluation would be done after the withdrawal of relief and rehabilitation activities in order to assess

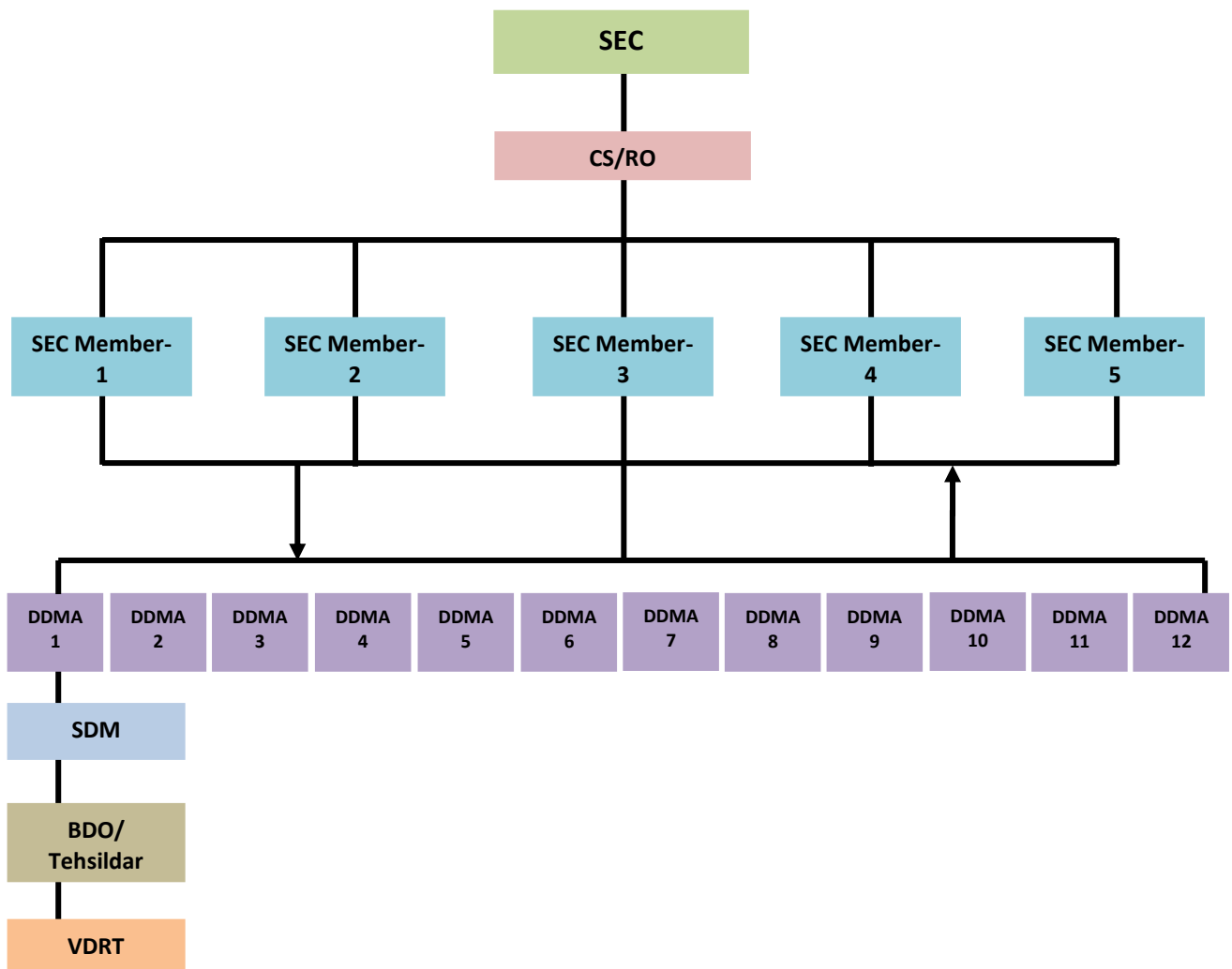
- the nature of state intervention and support,
- suitability of the organization structure,
- institutional arrangements,
- adequacy of Operating Procedures,
- monitoring mechanisms,
- information tools,
- equipment,
- communication system, etc.

The impact studies on the above operations for long-term preventive and mitigation efforts are to be undertaken. Evaluation exercises would be undertaken to understand the perceptions about disaster response in terms of

- adequacy of training
- alert and warning systems
- control room functions
- communication plans
- security
- containment
- recovery procedures
- monitoring

The evaluation will be done by SEC.

Coordination with DDMA's



ANNEXURE

ANNEXURE – I

Important Telephone Numbers

S. #	Body / Department / Organisation	Designation	Telephone Number (O)	Telephone Number (R)		
A.	State Disaster Management Authority					
A.1	Chairperson	Honourable Chief Minister	0177-2625400	0177-2621384		
A.2	Member	Honourable Revenue Minister	0177-2621196	0177-2621693		
A.3	Chief Executive Officer (Ex-officio)	Chief Secretary	0177-2621022	0177-2620277		
A.4	Member: Shri Deepak Sanan	Addl. Chief Secretary-cum FC (Rev)	0177-2622382 0177-2622080	0177-2626227		
A.5	Member: Dr. P. C. Dhiman	Pr. Secy. (Home)	0177-2622269	0177-2628282		
A.6	Member: Shri J. C. Sharma	Pr. Secy. (PWD/I and PH)	0177-2621907	0177-2623927		
A.7	Member: Shri Ali Raza Rizvi	Pr. Secy. (Health)	0177-2622080	0177-2620580		
A.8	Member: Shri I. D. Bhandari	Director General Police	0177-2626938	0177-2628940		
A.9	Member: Shri Gopal Chand	Addl. Secy. (Revenue)	0177-2621157			
B.	State Executive Committee					
B.1	Chairperson (Ex-officio)	Chief Secretary	0177-2621022	0177-2620277		
B.2	Member: Shri Deepak Sanan	Pr. Secy. cum FC (Rev)	0177-2622382	0177-2226227		
B.3	Member: Dr. P. C. Dhiman	Pr. Secy. (Home)	0177-2620105	0177-2628282		
B.4	Member: Shri Ali Raza Rizvi	Pr. Secy. (Health)	01772622080	0177-2620580		
B.5	Member Secretary	Secy. (Revenue)	0177-2621157			
C.	Telephone Numbers of Secretaries					
S. No.	Name	Designation	Department	Phone No. (O)	Phone No. (R)	Mobile
1	Shri Sudripta Roy	Chief Secretary	Govt. Of H.P.	0177-2621022	0177-2620277	98166-12555
2.	Shri P. Mitra	Add. Chief Secretary	(Agriculture & Fisheries)	0177-2621894	0177-2621658	98054-02323
3.	Shri Prem Kumar	Addl. Chief Secretary	(F&S and Consumer Affairs & Coop. and TD)	0177-2622382	0177-2804907	98160-40825
4.	Shri Deepak Sanan	Addl. Chief Secretary-cum-F.C.(Rev)	(MPP & Power, Revenue, R&R, NES)	0177-2622080	0177-2626227	98160-22740
5.	Shri Ajay Mittal	Pr. Secretary	CM, IPR & OSD (Coordination)	0177-2620625	0177-2624604	94180-04604

6.	Dr. P.C. Kapoor	Pr. Secretary	Ind. and Labour & Emp.)	0177-2620105	0177-2620676	94184-50676
7.	Dr. Asha Ram Sihag	Pr. Secretary	UD, TCP & Housing	0177-2624899		94188-88033
8.	Shri V.C. Pharka	Pr. Secretary	YSS Addl. charge Horti and S J & E)	0177-2621877	0177-2623295	94180-89118
9.	Dr. Bharathi S. Sihag	Pr. Secretary	(Forest Department)	0177-2621902	0177-	93126-06676
10.	Shri Narinder Chauhan	Pr. Secretary	(Election-cum-Chief Electoral Officer & F.C. Appeal)	0177-2620560	0177-2624480	94180-22448
11.	Shri P.C. Dhiman	Pr. Secretary	(Home, Vig, addl. charge IT and P & S and RC, Delhi)	0177-2622269	0177-2628282	94188-42066
12.	Dr. Shrikant Baldi	Pr. Secretary	(Fin. Plg. Eco. Stat. 20 P Prog. & E&T)	0177-2620043	0177-2620027	94181-61133
13.	Shri S.K.B.S. Negi	Pr. Secretary	(RD &PR)	0177-2621897	0177-2621077	94184-77077
14.	Shri Manisha Nanda	Pr. Secretary	(Pers. & LAC)	0177-2621195	0177-2623538	94185-00018
15.	Shri Ali Raza Rizvi	Pr. Secretary	(Health & FW & Ayurveda)	0177-2621904	0177-2620580	98166-76222
16.	Shri Sanjay Gupta	Pr. Secretary	(AR & Training, FA & RPG)	0177-2621586	0177-2620451	94595-75451
17.	Shri K. Sanjay Murthy	Secretary	(Edu.MD Power Corp.)	0177-2621715	0177-2629820	98160-91190
18.	Dr. Ajay Bhandari	Secretary	(GAD, SAD, SW & Parl. Affairs.	0177-2621892	0177-2801902	94180-03300
19.	Shri J.C. Sharma	Secretary	Public Works Deptt.	0177-2621907	0177-2623927	94180-00066
20.	Shri Maneesh Garg	Secretary	(Fin. cum- Dir, TA & Lotteries)	0177-2621859	0177-2625033	94180-96033
21.	Dr. Nagin Nanda	Secretary	(Env. Science & Tech)	0177-2624538	0177-2627609	94185-00015
D.	Telephone Numbers of Head of the Departments					
1.		Director	Agriculture	0177-2830620	0177-2830129	
2.		Director	Ayurveda	0177-2622262		
3.		Commandant General	Home Guards & Civil Defence	0177-2811453	0177-2623962	
4.		Registrar	Cooperatives	0177-2620970	0177-2628144	
5.		Economic Adviser	Economics & Statistics	0177-2626302	0177-2628217	

6.		Director	Higher Education	0177-2656621	0177-2657510	
7.		Director	Elementary Edu.	0177-2812464	0177-2626911	
8.		Chief Electoral Officer	Election Department	0177-2620024	0177-2620580	
9.		Chief Elect. Inspector	Electrical Inspectorate	0177-0177-2621020		9418102654
10.		Director	Directorate of Estate	0177-2622217	0177-2842970	
11.		E&T Commissioner	Excise & Taxation Department	0177-2621835	0177-2623927	
12.		Director	Fire Services Deptt	0177-2811453	0177-2623962	
13.		Director-cum-Warden	Directorate of Fisheries	01978-224068	01978-223390	
14.		Director	Directorate of Food, Civil Supplies & Cons Affairs	0177-2623749	0177-2623279	
15.		Pr.CCF	Forest Department, Talland	0177-2623155	0177-2628220	
16.		Director	Health & Family Welfare Deptt.	0177-2621424		
17.		Director	Dental Health	0177-2621594	0177-2622917	
18.		Secretary	Indian Red Cross Society	0177-2621868	0177-2640832	
19.		Director	Horticulture	0177-2842390	0177-2626056	
20.		Director	Hospitality & Protocol	0177-2621007	0177-2804288	
21.		Principal	HP Govt. Dental College & Hospital	0177-2658838	0177-2653322	
22.		Director	Directorate of Medical Edu. & Research	0177-2620733	0177-2653322	
23.		Principal	I.G.M.C.	0177-2804251	0177-2805502	
24.		Principal	Dr. Rajendra Prasad Govt. Med. College, Tanda	267115	287173	
25.		Director	Dirt. Of Ind.	0177-		9418230009

			Geological Wing & DIC,	2813414		
26.		Director	Deptt. Of Information Technology,	0177-2628914	0177-2622548	
27.		Director	Deptt. Of Env & Scientific Tech.	0177-2620559	0177-2627609	
28.		Director	HP Institute of Public Admn. Fairlawns	0177-2647855	0177-2620741	
29.		Engineer-in-Chief	Irrigation & Public Health, Shimla	0177-2658886	0177-2670026	
30.		Labour Commr. Director	Labour & Employment	0177-2625085	0177-2620237	
31.		Director	Land Records & Consolidation of Holdings	0177-2623678	0177-2626812	
32.		Director	Language & Culture	0177-2626616		
33.		Director	Local Audit Deptt.	0177-2620757	0177-2629795	
34.		Director	ABV Inst of Allied Sports, Manali	01902-253789	01902-252341	
35.		Adviser, Plg	Planning Deptt., Yojana Bhawan	0177-2621698	0177-2623826	
36.		Director General	Police Deptt., Nigam Vihar	0177-2626938	0177-2645538	
37.		Controller	Printing & Stationery Deptt.	0177-2830378	0177-2657779	
38.		Director	Directorate of Prosecution	0177-2623871	0177-2656264	
39.		Director	Information & Public Relations	0177-2621853	0177-2670663	
40.		Engineer-in-Chief	Public Works Department	0177-2621401	0177-2652127	
41.		Director General	Prisons Deptt	0177-2628851	0177-2671280	
42.		Director	Rural Development	0177-2623820	0177-	
43.		Director	Panchayati Raj	0177-2623820	94180-83222	
44.		Director	Small Savings, Yojana Bhawan, H.P. Secretariat	0177-2622482	0177-2626647	
45.		Director	Sainik Welfare Deptt., Hamirpur	01972-224659	01972-225961	

46.		Settlement Officer	Settlement Deptt	0177-2623995	0177-2670563	
47.		Director	Social Justice & Emp.	0177-2621957	0177-2812033	
48.		Director	Technical Ed., Vocational & Ind. Trg. Sundernagar	01907-266120	01907-266375	
49.		Director	Tourism & Civil Aviation	0177-2625864	0177-2652874	
50.		Director	Town & Country Planning	0177-2622494		
51.		Director	Transport	0177-2803136	0177-2651731	
52.		Director	Treasuries, Accounts & Lotteries	0177-2621859	0177-2622548	
53.		Director	Urban Development	0177-2626518		94180-01253
54.		Director	Youth Services & Sports	0177-2621007	0177-2804288	
E. Divisional Commissioners' Office						
S. #	Division	Designation		Phone (O)	Phone (R)	
	Kangra	Divisional Commissioner		01892-229022	01892-229048	
	Shimla	Divisional Commissioner		0177-2625041	0177-2801902	
	Mandi	Divisional Commissioner		01905-237848	01905-236757	
F. Deputy Commissioners' Office						
1.	Kangra	Deputy Commissioner		01892-222103	01892-224950	
2.	Mandi	Deputy Commissioner		01905-225201	01905-236202	
3.	Shimla	Deputy Commissioner		0177-2655988	0177-2652874	
4.	Solan	Deputy Commissioner		01792-220656	01792-220555	
5.	Chamba	Deputy Commissioner		01899-224847	01899-225380	
6.	Sirmaur	Deputy Commissioner		01702-225025	01702-225026	
7.	Una	Deputy Commissioner		01975-225800	01975-225900	
8.	Hamirpur	Deputy Commissioner		01972-224300	01972-224343	
9.	Kullu	Deputy Commissioner		01902-222727	01902-222726	
10.	Bilaspur	Deputy Commissioner		01978-224155	01978-224150	
11.	Kinnaur	Deputy Commissioner		01786-222252	01786-222251	
12.	Lahaul-Spiti	Deputy Commissioner		01900-222501	01900-222503	
G. Superintendents of Police						
1.	Kangra	SP, Kangra		01892-222244	01892-222991	
2.	Mandi	SP, Mandi		01905-2222470	01905-224270	
3.	Shimla	SP, Shimla		0177-2656535	0177-2628800	
4.	Solan	SP, Solan		01792-220567	01792-220568	
5.	Chamba	SP, Chamba		01899-222242	01899-222741	

6.	Sirmaur	SP, Sirmaur	01702-225001	01702-225001
7.	Una	SP, Una	01975-225056	01975-226057
8.	Hamirpur	SP, Hamirpur	01972-224358	01972-224357
9.	Kullu	SP, Kullu	01902-224700	01902-
10.	Bilaspur	SP, Bilaspur	01978-224500	01978-224180
11.	Kinnaur	SP, Kinnaur	01786-222270	01786-222288
12.	Lahaul-Spiti	SP, Lahaul and Spiti	01900-222226	01900-222227
District Emergency Operation Center Number (Toll Free)				1077

ANNEXURE- II**Format for First Information Report on occurrence of natural calamity**

(To be sent to SEOC and NEOC, Government of India within maximum of 24 hours of occurrence of calamity)

From: District/State -----

Date of Report -----

To

- i) The Relief Commissioner cum Principal Secretary Revenue (Fax: _____ email: ____)
- ii) JS (DM), MHA (fax : _____ ; email : _____)
- iii) I/c National Integrated Operations Centre, MHA (fax: _____; email: _____)

- a. Nature of Calamity
- b. Date and time of occurrence
- c. Affected area (number and names of affected districts)
- d. Population affected (approx.)
- e. Number of Persons
 - i) Dead
 - ii) Missing
 - iii) Injured
- f. Animals
- g. Affected
- h. Lost
- i. Crops affected and area (approx.)
- j. Number of houses damaged
- k. Damage to public property
- l. Relief measures undertaken in brief
- m. Immediate response and relief assistance required and the best logistical means of delivering that relief from State/National
- n. Forecast of possible future developments including new risks.
- o. Any other relevant information

ANNEXURE-III

Rapid Assessment

Disaster brings in its wake damages to life, property, infrastructure, economy and environment. For adequate and effective response to disasters it is of paramount importance to assess the extent of physical harm to assets, property and infrastructure which render them less valuable or less effective. The objective of Rapid Assessment is to determine the precise nature and extent of damage so that Rescue and Relief measures are undertaken in the affected people. The following are the major components to be included in the rapid damage assessment:

- i) Geographical area impacted
- ii) Structural damage to buildings, Housing stocks
- iii) Damage to roads and bridges, public buildings shops, workshops, stalls etc.
- iv) Damage to water supply lines, electricity supply lines, public utilities
- v) Damage to agricultural crops, livestock, etc.

Tools for Rapid Assessment

- Arial surveys
- Photographs, video graph/film of the affected area
- Satellite imagery
- Field reports
- TV/Press coverage

Visual Inspection Checklist:

- ✓ Camera
- ✓ Laptop
- ✓ Notebook
- ✓ GIS Map
- ✓ GPS

ANNEXURE - IV**Situation Report****DATE OF REPORT:**

Sl. No.	Category	Report of happenings during the last 24 Hours	Cumulative damage/loss
I - Rainfall and Damage/Loss Position			
1.	Indicate Place and rainfall (in CMs)		
2.	Details of rainfall		
3.	Brief details & cause (s) of flash/riverine floods, landslides, road blocked etc.		
4.	Population affected if any		
5.	Number of human lives lost district-wise (specify the cause of death)		
6.	Number of Cattle/livestock lost/perished.		
7.	Area affected (in hectares)		
8.	Estimated value of damaged crop (Rs. In lakh)		
9.	Number of houses damaged		
	i) Fully		
	ii) Partially		
10.	Estimated value of damaged to houses (Rs. In lakh)		
	i) Fully		
	ii) Partially		
11.	Impact of flood on infrastructure (sector-wise i.e. power supply, water supply, road transport, health sector and telecommunication etc. – in physical term)		
12.	Estimated value of damage to public properties-sector-wise in monitoring terms (Rs. In lakh)		
13.	Estimated value of total damage (8+10+12)		
II - Fire Incidents			
1.	No. of domestic fire incidents, causes, with brief details		
2.	Loss of life		
3.	Loss of cattle		
4.	Total loss of property (in lakh)		
5.	No. of wild fire incidents		
6.	Area involved (in hectares)		
7.	Estimated loss of forest wealth (in lakh)		
8.	Estimated value of loss/damage		
III – Accidents			
1.	No. of accidents – roads and others (Please		

	specify the category)		
2.	Loss of life		
3.	No. of injured		
4.	Cause of accident		
IV- Snow Fall			
1.	Indicate Place and snowfall (in CMS)		
2.	Details of loss/damage if any		
3.	Estimated value of loss (in lakh)		
V – Hailstorm			
1.	Indicate Place and area of hailstorm (in hectares)		
2.	Estimated Value of loss (in lakh)		
VI – Other incidents of loss of life & Property			
1.	Detail of loss/damage with estimated value		
VII - Any other relevant information			
1.	Number of persons evacuated (district wise)		
2.	Number of relief camps opened (district wise)		
3.	Number of persons accommodated in the relief camps (district wise)		
4.	Details of distribution of essential commodities		
5.	GR paid, if any specify the items and amount		
6.	Steps taken to prevent outbreak of epidemic including the deployment of medical terms (district-wise). Whether outbreak of any epidemic occurred?		
7.	Whether assistance of from Army, Air Force and Navy sought (Specify details of no. of column/helicopters/ naval divers provided and their place of deployment as well as number of days etc.)		
8.	Whether assistance of NDRF Battalions sought, if so details of deployment.		
9.	Number of cattle camps opened & details of cattle accommodated therein		
10.	Any other relief measures undertaken (give details)		

Note: Kindly attached annexure for details wherever required.

Signature of officer with Name & Date
Telephone No/Fax No.
Mobile No.

<p>(d) Number of schools affected</p> <ul style="list-style-type: none"> - Gravity of the damages <p>(e) Number of hospitals and Health Centers affected</p> <ul style="list-style-type: none"> - Gravity of the damages <p>(f) Number of Government buildings affected</p> <ul style="list-style-type: none"> - Gravity of the damages <p>(g) Any other building affected</p> <ul style="list-style-type: none"> - Gravity of the damages 	<p>Scale 1 to 5 where 1 is no damages and 5 is completely destroyed</p>
<p>12. Infrastructure</p> <p>(a) Road Damaged/destroyed</p> <ul style="list-style-type: none"> - Scale of the damage - Location - Km <p>(b) Railways damaged</p> <ul style="list-style-type: none"> - Location - Km - Is the railway still working <p>(c) Bridges damaged/collapsed</p> <ul style="list-style-type: none"> - Locality - Villages isolated <p>(d) Damages to the Communication Network</p> <p>(e) Damages to the Electricity Network</p> <p>(f) Damages to the Telecommunication Network</p>	<p>Scale 1 to 5 where 1 is normal and 5 is completely destroyed/washed away</p> <p>Yes/No</p> <p>Yes/No</p> <p>Yes/No and scale of the damages</p> <p>Scale 1 to 5 where 1 is no damages and 5 is completely destroyed</p>
<p>13. Health Facilities</p> <p>(a) Infrastructure damaged</p> <ul style="list-style-type: none"> - Hospitals - Health Centers - Vaccination Centers <p>(b) Availability of Doctors</p> <ul style="list-style-type: none"> - In the area - In the district <p>(c) Availability of Paramedical staff</p> <ul style="list-style-type: none"> - In the area - In the district <p>(d) Local Staff affected</p> <ul style="list-style-type: none"> - Doctors - Paramedical Staff <p>(e) Conditions of equipments Specify which equipments</p> <p>(f) Availability of medicines/drugs</p> <ul style="list-style-type: none"> - Typology <p>(g) Availability of Vaccinations</p> <ul style="list-style-type: none"> - Typology <p>(h) Any immunization campaign was undertaken before the disaster</p> <p>(i) Possibility of diseases outbreak</p> <p>(j) Other health problems</p>	<p>Number</p> <p>Scale 1 to 5 where 1 is no damages and 5 is completely destroyed</p> <p>Number</p> <p>Number</p> <p>Number</p> <p>Scale 1 to 5 where 1 is no damages and 5 is completely destroyed</p> <p>Yes/No</p> <p>Yes/No</p> <p>Yes/No</p> <p>Yes/No</p> <p>Yes/No</p> <p>List</p>

<p>14. Water Sanitation</p> <p>(a) Availability of safe drinking water</p> <p>(b) Availability of sanitation facilities</p> <p>(c) Availability of Disinfectant</p> <ul style="list-style-type: none"> - Typology <p>(d) Damages to the Water/Sewage systems</p> <p>(e) Damages to the water supply system</p> <p>(f) Availability of portable water system</p> <p>(g) Agencies participating in WATSAN</p>	<p>Yes/No</p> <p>Yes/No</p> <p>Yes/No</p> <p>Scale 1 to 5 where 1 is no damages and 5 is completely destroyed</p> <p>Yes/No</p> <p>List</p>
<p>15. Crops/Agriculture Damage</p> <p>(a) Crop Damaged</p> <ul style="list-style-type: none"> - Typology - % Of Hectare damaged - In Upland/medium/low - Paddy or Non paddy - Irrigated or non-irrigated <p>(b) Normal and actual rainfall assessment</p> <p>(c) Livestock loss</p> <p>(d) Availability of Health services for livestock</p> <p>(e) Cattle feed/folder availability</p> <p>(f) Damage to agriculture infrastructure</p>	<p>Mm</p> <p>Number</p> <p>Yes/No</p> <p>Number</p> <p>Tonnes</p> <p>Scale 1 to 5 where 1 is no damages and 5 is completely destroyed</p>
<p>16. Food/Nutrition</p> <p>(a) Availability of food/stocks</p> <ol style="list-style-type: none"> (1) Family (2) Relief (3) PDS (4) Community Kitchen <p>(b) Expected duration of the food stock</p> <p>(c) Most affected groups</p> <ul style="list-style-type: none"> - Infant - Children - Pregnant and lactating mothers - Elderly <p>(d) Where are the different groups located?</p> <p>(e) Levels of malnutrition?</p> <p>(f) Type of food required</p> <p>(g) Total quantity/ration levels required</p> <p>(h) How is the food supply and nutrition situation likely to evolve in coming</p>	<p>Yes/No</p> <p>Kg</p> <p>Tonnes</p> <p>Tonnes</p> <p>Kg</p> <p>Days</p> <p>To be ticked</p> <p>Days</p> <p>To be ticked</p>

weeks/months?	
<p>15. Secondary Threats</p> <p>(a) Potentially hazardous sites (b) Existence of epidemics (c) Scarcity of Food (d) Scarcity of Water (e) Scarcity of Shelter (f) Scarcity of Clothes (g) Any other problem</p>	List
<p>16. Response</p> <p>(a) <u>Local</u>: Govt./NGOs/CSOs/Individuals Type of assistance</p> <p>(b) <u>National</u>: Govt./NGOs/CSOs Type of assistance</p> <p>(c) <u>International</u>: Govt./NGOs/CSOs Type of assistance</p>	<p>To be ticked Description</p> <p>To be ticked Description</p> <p>To be ticked Description</p>
<p>17. Logistic and Distribution system</p> <p>(a) Availability of Storage facilities (b) Means of transport available (c) Availability of Fuel (d) Are there any distribution criteria already in place Availability of Manpower</p>	<p>Yes/No List Yes/No Yes/No Yes/No</p>
<p>18. Priority of Needs</p> <p>Search and Rescue:</p> <p>(a) Need of Search and Rescue - Locally available - Needed for neighbouring districts - Needed for neighbouring states (indicate from where)</p> <p>(b) Need of transportation and equipment: - Boats - Any other transportation(specify) - Special equipment(specify) - Heavy equipment(specify)</p> <p>(c) Need of shelter - Temporary - Permanents</p> <p>Clothing: (a) Children Clothing (b) Adult Clothing</p>	<p>Yes/No</p> <p>Estimated Quantity</p>

<ul style="list-style-type: none"> (c) Winter Clothing (d) Blankets (e) Bed Sheets <p>1.1 Food item:</p> <ul style="list-style-type: none"> (a) Pulses (b) Grain (c) Baby Food (d) Specialized food (e) Cattle feeds/fodder <p>Water /sanitation:</p> <ul style="list-style-type: none"> (a) Portable water (b) Chlorine powder and disinfectant (c) Latrine (d) Soap (e) Detergent (f) Insecticides (g) Disinfestations of water body (h) Manpower for carcass disposal <p>1.2 Health:</p> <ul style="list-style-type: none"> (a) Medical staff (b) Medicines(specify) (c) IV fluid (d) ORS (e) Vitamin A (f) Vaccines (g) Mobile units(quantity to be specified) (h) Cold chain system <p>1.3 Education:</p> <ul style="list-style-type: none"> (a) Infrastructure temporary / permanent (b) Teachers (c) Teachers kits (d) Reading materials (e) Availability of mid-day meal <p>Crop/Agriculture</p> <ul style="list-style-type: none"> (a) Need of seeds (b) Fertilizer , Pesticide (c) Type of Seed required (d) Availability of local variety (e) Availability of resources <p>Infrastructure:</p> <ul style="list-style-type: none"> (a) Repair of roads (b) Repair of railways and bridges (c) Power Supply (d) Telecommunication (e) Equipment required for 	<p>List</p> <p>Yes/No and specify location Yes/No and specify location</p> <p>List</p> <p>Number of Man days</p>
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restoration (f) Manpower required	
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- **Observation:**
- **Source of information:**
- **Site Visit:**
- **Interaction with affected population:**
- **Assessment Carried By:**

ANNEXURE - VI**Flow Chart for Disposal of Dead Bodies at District Level**

1. Activate the DM Plan
2. Nodal Officer in the incident Response System will activate all other stake-holders associated with Disposal of the Dead.
3. Establish an information Centre at the site of Disaster/District HQ.
4. Inform all other Stake-holders, both in government and Non-Governmental sector, including the elected, Panchayati Raj functionaries and the community.
5. Activate search and Rescue teams of Fire & Emergency Services, Police, SDRF, Civil Defence, NDRF and NGOs for the retrieval of the injured and the dead.
6. The injured will get the priority for First Aid and evacuation to hospital.
7. Prepare a record of details of the bodies retrieved in the Dead Body Inventory Record Register, allocated individual Identification Number, photographed, and then Dead Body Identification Form initiated.
8. Associate relatives and community members for the identification of the bodies.
9. Hand over the identified bodies to the relatives or the community, and if necessary after cross-matching Dead Body Identification Form with that of the Missing Person Form, for the last rites as per local, cultural and religious denomination.
10. Unidentified or unclaimed dead bodies/body parts shall be transported to the mortuaries for proper preservation and storage at the designated sites.
11. Consult relatives, legal and forensic experts for positive identification.
12. Final disposal of unidentified bodies/body parts shall be done by District authorities after applying all the possible means of identification as per the legal provisions.
13. The bodies of foreign nationals shall be properly preserved either by embalming or chemical methods and then placed in body bags or in coffins with proper labeling. Handing over and transportation of such bodies shall take place through the Ministry of Extern Affairs, in consultation with the Consular offices of the concerned countries and other actors such as International Committee of the Red Cross, if necessary and possible.

ANNEXURE – VII**Guidelines for Disposal of Animal Carcasses****1. Guidelines for Burial**

- 1.1. Burial shall be performed in the most remote area possible.
- 1.2. Burial areas shall be located a minimum of 300 feet down gradient from wells, springs and other water sources.
- 1.3. Burial shall not be made within 300 feet of streams or ponds, or in soils identified in the country soil survey as being frequently flooded.
- 1.4. The bottom of the pit or trench should be minimum 4 to 6 feet above the water table.
- 1.5. Pits or trenches shall approximately be 4 to 6 feet deep. They should have stable slopes not steeper than 1 foot vertical to 1 foot horizontal.
- 1.6. Animal Carcasses shall be uniformly placed in the pit or trench so that they do not exceed a maximum thickness of 2 feet. The cover over and surrounding shall be a minimum of 3 feet. The cover shall be shaped so as to drain the runoff away from the pit or trench.
- 1.7. The bottom of trenches left open shall be sloped to drain and shall have an outlet. All surface runoff shall be diverted from entering the trench.
- 1.8. Burial areas shall be inspected regularly and any subsidence or cavities filled.

2. Guidelines for Composting

- 2.1 Select site that is well drained, at least 300 feet from water sources, sinkholes, seasonal seeps or other landscape features that indicate hydrological sensitivity in the area.
- 2.2 Lay 24-inch bed of bulky, absorbent organic material containing sizeable pieces 4 to 6 inches long. Wood chips or hay straw work well. Ensure the base is large enough to allow for 2-foot clearance around the carcass.
- 2.3 Lay animal in the centre of the bed. Lance the rumen to avoid bloating and possible explosion. Explosive release of gases can result in odour problems and it will blow the cover material off the composting carcass.
- 2.4 When disposing large amounts of blood or body fluid, make sure there is plenty of material to absorb the liquid. Make a depression so blood can be absorbed and then cover, if a blood spill occurs, scrape it up and put back in pile.
- 2.5 Cover carcass with dry, high-carbon material, old silage, sawdust or dry stall bedding (some semi-solid manure will expedite the process). Make sure all residuals are well covered to keep odours down, generate heat or keep vermin or other unwanted animals out of the window.
- 2.6 Let it sit for 4 to 6 months, then check to see if carcass is fully degraded.
- 2.7 Reuse the composted material for carcass compost pile, or remove large bones and land apply.

- 2.8 Site cleanliness is the most important aspect of composting; it deters scavengers, and helps control odours and keeps good neighborly relations.

Note: Animals that show signs of a neurological disease, animals that die under quarantine and those with anthrax should not be composted.

Reference: USDA Natural Resource Conservation Service, Arkansas Livestock and Poultry Commission, University of Arkansas.

Flow Chart for Disposal of Animal Carcasses at District Level

- a. Activate the DM Plan.
- b. Nodal Officer in the Incident Response System will activate all other stakeholders associated with the disposal of Animal Carcasses.
- c. Establish an Information Centre at the site of Disaster/District HQ.
- d. Inform all other Stake-holders, both in government and Non-Governmental sector, including the elected, Panchayati Raj functionaries and the community.
- e. Activate Animal Carcass Retrieval teams for the recovery and retrieval of the injured livestock and the animal carcasses.
- f. Injured livestock will get the priority for First Aid and evacuation to hospital.
- g. Prepare a record of details of the animal carcasses retrieved.
- h. Associate owners of the livestock, or their relatives and community members for the identification of the animal carcasses.
- i. Hand over the identified animal carcasses to the owners for disposal at the selected site.
- j. All unidentified animal carcasses will be photographed preferably before transportation for disposal.
- k. Unidentified or unclaimed animal carcasses shall be transported to the designated site for disposal by District authorities as per the Disaster Plan.

Annexure - VIII

Government of Himachal Pradesh Department of Revenue (DMC)

Emergency Support Functions (ESFs) Plan

In the aftermath of a major natural disaster wherein State Government's assistance is required for the districts, the command, control and coordination will be carried out under the ESFs Plan.

EOC shall activate the ESFs and the concerned Department/Agency of each ESFs shall identify requirements in consultation with their counterparts in affected districts, mobilize and deploy resources to the affected areas to assist the district (s) in its/their response action. The State EOC shall maintain a close link with the District EOCs and NEOC.

ESFs shall be responsible for the following:

1. They will coordinate directly with their functional counterpart in districts to provide the state government assistance required. Request for assistance will be channeled from the district both through the Deputy Commissioner and designated departments/ agencies. Based on the identified requirements by the districts, appropriate assistance shall be provided by an ESF Department/ Agency to the district or at the Deputy Commissioner's request, directly to an affected area.
2. The designated authorities for each of ESF shall constitute quick response teams and assign the specific task to each of the member.
3. The designated authorities for each of the ESF shall identify and earmark the resources i.e. Manpower and materials to be mobilized during the crisis.
4. An inventory of all the resources with details shall be maintained by each of the designated authority for each of the ESF.
5. The designated authority for each of the ESF will also enter into pre-contracts for supply of resources, both goods and services to meet the emergency requirements.
6. The designated authority for each of the ESF will be delegated with adequate administrative, legal and financial powers for undertaking the tasks assigned to them.

Primary and Secondary Agencies

The designated primary agency, acting as the State agency shall be assisted by one or more support agencies (secondary agencies) and shall be responsible for managing the activities of the ESF and assisting the district in the rescue and relief activities and ensuring that the mission is accomplished. The primary and secondary agencies have the authority to execute response operations to directly support the needs of the affected districts.

Agency for Each Emergency Support Functions and Roles to be performed

ESF No.	ESF	Primary Agency	Secondary Agency	Responsibilities of Primary Agency	Activities for Response	Role of Secondary Agency
1.	Communication	BSNL	Police Units of Armed Forces in the area	Coordination of national actions to assure the provision of telecommunication support the state and district; Coordinate the requirement of temporary telecommunication in the affected areas.	Responsible for coordination of national actions to assure the provision of telecommunication support the state and district response elements; Coordinate the requirement of temporary telecommunication in the affected areas.	Make available police wireless network at the affected locations; Coordinate for the other networks available such as Ham Radios or HPSEB network etc.;; The units of armed forces in the area would provide communication network on the request of the competent authority.
2	Public Health	Department of Health and Family Welfare	Department of Ayurveda	To coordinate, direct and integrate State level response; Direct activation of medical personnel, supplies and equipment; Coordinate the evacuation of patients;	Provide systematic approach to patient care; Perform medical evaluation and treatment as needed; Maintain patient tracking system to keep record of all patients treated;	To perform the same functions as assigned to the primary agency; Provide manpower to the primary agency wherever available and needed; Make available its resources to the primary agency wherever

				<p>Provide human services under the Dept of health;</p> <p>To prepare and keep ready Mobile Hospitals and stock;</p> <p>To network with private health service providers;</p> <p>To provide for mass decontamination;</p> <p>Check stocks of equipment and drugs.</p>	<p>Mobilization of the private health services providers for emergency response.</p> <p>In the event of CNBR disaster to provide for mass decontamination of the affected population;</p> <p>Maintain record of dead and arrange for their post mortem.</p>	needed and available.
3.	Sanitation/ Sewerage Disposal	Urban Development and Rural Development	Irrigation and Public Health	<p>Make arrangement for proposal disposal of waste in their respective areas;</p> <p>Arrange adequate material and manpower to maintain cleanliness and hygiene.</p>	<p>Ensure cleanliness and hygiene in their respective areas;</p> <p>To arrange for the disposal of unclaimed bodies and keeping record thereof;</p> <p>Hygiene promotion with the availability of mobile toilets;</p> <p>To dispose off the carcass.</p>	<p>Repair the sewer leakages immediately;</p> <p>Provide bleaching powder to the primary agencies to check maintain sanitation.</p>
4.	Power	HPSEB Ltd.	Himurja	Provide and coordinate State support until the local authorities are prepared to handle all power related	<p>Support to Local Administration;</p> <p>Review the total extent of damage to the power supply</p>	Make arrangement for and to provide the alternative sources of lighting and heating to the affected populations and for the relief camps.

				<p>problems;</p> <p>Identify requirements of external equipment required such as DG sets etc;</p> <p>Assess damage for national assistance.</p>	<p>installations by a reconnaissance survey;</p> <p>To provide alternative means of power supply for emergency purposes;</p> <p>Dispatch emergency repair teams equipped with tools, tents and food;</p> <p>Hire casual labour for the clearing of damaged poles etc.</p>	
5.	Transport	Department of Transport	HRTC, Civil Aviation, GAD	<p>Overall coordination of the requirement of transport;</p> <p>Make an inventory of vehicles available for various purposes;</p> <p>Coordinate and implement emergency related response and recovery functions, search and rescue and damage assessment.</p>	<p>Coordinate arrangement of vehicles for transportation of relief supplies from helipads/airports to the designated places;</p> <p>Coordinate arrangement of vehicles for transportation of SAR related activities.</p>	<p>Make available its fleet for the purpose of SAR, transportation of supplies, victims etc;</p> <p>Act as stocking place for fuel for emergency operations;</p> <p>Making available cranes to the Distt. Administration; GAD and Civil aviation will coordinate for helicopter services etc. required for transportation of injured, SAR team, relief and emergency supplies.</p>
6.	Search and Rescue	Civil Defence, Home Guards, Fire and Emergency	NDRF, SDRF, Armed and Para military forces, Police, Red Cross, VOs,	Establish, maintain and manage state search and rescue response system;	GIS is used to make an estimate of the damage area and the deployment of the SAR team in the area according to the priority;	108 and Red Cross to make available ambulances as per requirement; SDRF, VOs and Volunteers to

		Services	Volunteers and 108.	<p>Coordinate search and rescue logistics during field operations;</p> <p>Provide status reports of SAR updates throughout the affected areas.</p>	<p>Discharge all ambulatory patients for the first aid which has the least danger to health and others transported to safer areas.</p>	<p>assist the primary agency in SAR;</p> <p>NDRF, Armed and para military forces to provide assistance to civil authorities on demand;</p> <p>Police to arrange for the transportation and postmortem of the dead.</p>
7.	Public Works and Engineering	HP PWD	CPWD, National Highways Authority of India, MES, BRO	<p>Emergency clearing of debris to enable reconnaissance;</p> <p>Clearing of roads;</p> <p>Assemble casual labour;</p> <p>Provide a work team carrying emergency tool kits, depending on the nature of disaster, essential equipment such as</p> <ul style="list-style-type: none"> • Towing vehicles • Earth moving equipments • Cranes etc. <p>Construct temporary roads;</p>	<p>Establish a priority list of roads which will be opened first;</p> <p>Constructing major temporary shelters;</p> <p>Connecting locations of transit/relief camps;</p> <p>Adequate road signs should be installed to guide and assist the relief work;</p> <p>Clearing the roads connecting helipads and airports;</p> <p>Restoring the helipads and making them functional;</p> <p>Rope in the services of private service providers and secondary services if the</p>	<p>Making machinery and manpower available to the PWD and to keep national highways and other facilities in functional state.</p>

				<p>Keep national and other main highways clear from disaster effects such as debris etc.;</p> <p>Networking with private services providers for supply of earth moving equipments etc.</p>	<p>department is unable to bear the load of work.</p>	
8.	Information and Communication	Department of Revenue through State EOC	Department of IT/NIC	<p>Operate a Disaster Welfare Information (DWI) System to collect, receive, and report and status of victims and assist family reunification;</p> <p>Apply GIS to speed other facilities of relief and search and rescue;</p> <p>Enable local authorities to establish contact with the state authorities;</p> <p>Coordinate planning procedures between district, the state and the centre;</p> <p>Provide ready formats for all reporting procedures as a standby.</p>	<p>Documentation of response/ relief and recovery measures;</p> <p>Situation reports to be prepared and completed every 3-4 hours.</p>	<p>Render necessary assistance in terms of resources, expertise to the primary agency in performing the assigned task.</p>

9.	Relief Supplies	Department of Revenue	Department of Food and Civil Supplies	<p>To collect, process and disseminate information about an actual or potential disaster situation to facilitate the overall activities of all responders in providing assistance to an affected area in consultation;</p> <p>Coordinate activities involved with the emergency provisions;</p> <p>Temporary shelters;</p> <p>Emergency mass feeding;</p> <p>To coordinate bulk distribution of emergency supplies;</p> <p>To provide logistical and resource support to local entities;</p> <p>In some instances, services also may be provided to disaster workers;</p> <p>To coordinate damage assessment and post</p>	<p>Support to Local Administration;</p> <p>Allocate and specify type of requirements depending on need;</p> <p>Organize donation (material) for easy distribution before entering disaster site.</p>	<p>To assist the primary agency in arranging and supplying relief supplies;</p> <p>To assist the primary agency in running the relief camps.</p>
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				disaster needs assessment.		
10.	Food & Supplies	Department of Food and Public Distribution	Department of Cooperation	<p>Requirement of food and clothing for affected population;</p> <p>Control the quality and quantity of food, clothing and basic medicines;</p> <p>Ensure the timely distribution of food and clothing to the people;</p> <p>Ensure that all food that is distributed is fit for human consumption.</p>	<p>Make emergency food and clothing supplies available to population;</p> <p>Ensure the provision of specific nutrients and supplementary diet for the lactating, pregnant women and infants.</p>	Ensuring the distribution of food supplies to the affected population through the PDS network etc.
11.	Drinking water	Department of I & PH	Department of Urban Development	<p>Procurement of clean drinking water;</p> <p>Transportation of water with minimum wastage;</p> <p>Special care for women with infants and pregnant women;</p> <p>Ensure that sewer pipes and drainage are kept separate from drinking water facilities.</p>	<p>Support to local Administration;</p> <p>Water purification installation with halogen tablets etc.</p>	To assist the primary agency wherever ULB is associated in the distribution of potable water.
12.	Shelter	Department of Revenue	HIMUDA, HP PWD, UD and	Provide adequate and appropriate shelter to	Support to Local Administration;	HIMUDA and HP PWD would assist the primary agency in

			Panchayati Raj	<p>all population;</p> <p>Quick assessment and identifying the area for the establishment of the relief camps;</p> <p>Identification of public buildings as possible shelters;</p> <p>Identifying the population which can be provided with support in their own place and need not be shifted reallocated;</p> <p>Locate relief camps close to open traffic and transport links.</p>	<p>Locate adequate relief camps based on survey of damaged houses;</p> <p>Develop alternative arrangements for population living in structures that might be affected even after the disaster.</p>	<p>establishing temporary shelters of larger dimensions;</p> <p>Department of Panchayati Raj through local Panchayats would assist the primary agency in establishing shelters of smaller dimensions.</p>
13.	Media	Department of Public Relations	Local DD and AIR	<p>To Provide and collect reliable information on the status of the disaster and disaster victims for effective coordination of relief work at state level;</p> <p>Not to intrude on the privacy of individuals and families while collecting information;</p> <p>Coordinate with DOCs at</p>	<p>Use and place geographical Information to guide people towards relief operation;</p> <p>Use appropriate means of disseminating information to victims of affected area;</p> <p>Curb the spread of rumours;</p> <p>Disseminate instructions to all stakeholders.</p>	To assist the primary agency in discharge of its role.

				<p>the airport and railways for required information for international and national relief workers;</p> <p>Acquire accurate scientific information from the ministry of Science and Technology;</p> <p>Coordinate with all TV and radio networks to send news flashes for specific needs of Donation;</p> <p>Respect the socio-cultural and emotional state of the disaster victims while collecting information for dissemination.</p>		
14.	Help lines	Department of Revenue	Department of Public Relations	<p>To receive distress calls from the affected people and coordinate with the control room;</p> <p>To facilitate the optimization of donations received in kind;</p> <p>Co-ordinate, collect, process, report and display essential</p>	<p>One of the most critical needs will be having a simplified way of identifying and tracking victims and providing assistance;</p> <p>Identify locations for setting up transit and relief camps, feeding centres and setting up of the Help lines at the nodal points in the state and providing the people the information about the</p>	<p>To assist the primary agency in performing its job effectively and provide its manpower and resources for the purpose.</p>

				<p>elements of information and to facilitate support for planning efforts in response operations;</p> <p>Co-ordinate pre-planned and event-specific aerial reconnaissance operations to assess the overall disaster situation;</p> <p>Pre-positioning assessment teams headed by the State coordinating officer and deployment of other advance elements;</p> <p>Emergency clearing of debris to enable reconnaissance of the damaged areas and passage of emergency personnel and equipment for life saving property protection and health and safety.</p>	numbers.	
15.	Animal Care	Department of Animal Husbandry	Department of Panchayati Raj	<p>Treatment of animals;</p> <p>Provision of vaccination;</p> <p>Disposal of dead animals.</p>	<p>To arrange for timely care and treatment of animals in distress;</p> <p>Removal of dead animals to avoid outbreak of</p>	To assist the primary agency in performing its role.

					epidemics.	
16.	Law and Order	Police	Home Guards	<p>Having sound communication and security plan in place to coordinate law and order issues;</p> <p>Training to security personnel in handling disaster situations and issues related to them.</p>	<p>To maintain law and order;</p> <p>To take measure against looting and rioting;</p> <p>To ensure the safety and security of relief workers and material;</p> <p>To take specific measure for the protection of weaker and vulnerable sections of the society;</p> <p>To provide safety and security at relief camps and temporary shelters.</p>	To assist the primary agency by making available manpower.
17.	Removal of trees and fuel wood	Forest	Forest Corporation	<p>Removal of fallen trees;</p> <p>To provide fuel wood for the relief camps and public;</p> <p>Have adequate storage of fuel wood and make arrangement for distribution thereof;</p> <p>To provide fuel wood for cremation.</p>	<p>Arrange for timely removal of trees obstructing the movement of traffic;</p> <p>Arrange for timely removal of tress which have become dangerous;</p> <p>Make arrangement for fuel wood for the relief camps and for general public;</p> <p>Provide fuel wood for mass cremation etc.</p>	To support and supplement the efforts of the primary agency.

ANNEXURE - IX

Leading Non-Governmental Organizations and Agencies in the field of Disaster Management

#	Name of the Organization	Address	Contact Person	Phone	Fax	Email
United Nations Agencies having their offices in India						
1	United Nations Development Programme (UNDP)	Post Box No. 3059, 55 Lodhi Estate, New Delhi - 110003	Ms. Caitlin Wiesen (Country Director)	011-46532333	011-24627612	info.in@undp.org
2	United Nations Children's Fund (UNICEF) India	73 Lodi Estate, New Delhi - 110003	Ms. Karin Hulshof (Country Head)	011-24690401	011-24627521	newdelhi@unicef.org
3	United Nations Population Fund (UNFPA) India	55 Lodi Estate, New Delhi 110003	Ms. Frederika Meijer (UNFPA Country Representative)	011-46532333	011-24628078	india.office@unfpa.org
4	World Health Organization (WHO)	537, "A" Wing, Nirman Bhawan, Maulana Azad Road, New Delhi - 110011	Ms. Nata Menabde (Country Representative)	011-47594800	011-23382252	wrindia@searo.who.int
5	World Food Programme (WFP) India	2 Poorvi Marg, Vasant Vihar, New Delhi - 110057	Ms. Mihoko Tamamura (Country Director)	011-26150000	011-26150019	wfp.newdelhi@wfp.org
6	Office for the Coordination of Humanitarian Affairs (OCHA)	Palais des Nations, 1211 Geneva, Switzerland	Ms. Valerie Amos (Under-Secretary-General and Emergency Relief Coordinator)	+41 22 917 1690		ochagva@un.org
7	World Vision India	16, VOC Main Road, Kodambakkam, Chennai – 600024	Dr. Jayakumar Christian (National Director)	044-24807070	044-24807242	india@wvi.org
8	SOS Children's Village India	Plot No. 4, Block C-1,	Ms. YasminRiaz (Deputy	011-	011-	soscv@soscvindia.org

		Institutional Area, Nelson Mandela Marg, VasantKunj, New Delhi - 110070	National Director-FDC)	43239200	43239292	
9	Plan International	E-12, Kailash Colony, New Delhi - 110048	Mr. Roland Angerer (Country Director)	011- 46558484	011- 46558443	roland.angerer@plan- international.org
10	Lutheran World Service India	84, Dr. Suresh Sarkar Road, Kolkata 700014	Mr. Neville Pradhan (Director)	033- 22849200	033- 22443062	info@lws.org
11	Catholic Relief Services India	5, Community Centre, Kailash Colony Extension, Zamrudpur, New Delhi - 110048	Mr. KushalNeogy (Director - Partnership Capacity Building)	11- 29234211	11- 29237260	helpdesk@crsindia.org
12	Caritas India	CBCI Centre, Ashok Place, Opposite Gole Dakkhana, New Delhi - 110001	Fr. Varghese Mattamana (Executive Director)	011- 23363390	011- 23715146	director@caritasindia. net
13	Church's Auxiliary for Social Action (CASA)	Rachna Building, 4th floor,2 Rajendra Place, Pusa Road, New Delhi - 110008	Mr. Jayant Kumar (Head of Programmes)	011- 25730611	11- 25752502	jayant@casa-india.org
14	Action for Food Production (AFPRO)	25/1-A, Institutional Area, Pankha Road, D-Block, Janakpuri, New Delhi - 110058	Mr. D K Manavalan (Executive Director)	011- 28525452	011- 28520343	ed@afpro.org
15	Indo-Global Social Service Society	28, Institutional Area, Lodhi Road, New Delhi - 110003	Dr. Joseph Sebastian (Executive Director)	011- 45705000		doc@igsss.net
16	Oxfam India	2nd Floor, 1, Community Centre, New Friends Colony, New Delhi- 110065	Ms. Nisha Agrawal (Chief Executive Officer)	011- 46538000	011- 46538099	delhi@oxfamindia.org
17	ActionAid India	R-7, HauzKhas Enclave, New	Mr. Sandeep Chachra	011-	011-	sandeep.chachra@acti

		Delhi - 110016	(Executive Director)	40640500	41641891	onaid.org
18	Deutsche Welthungerhilfe (GAA)	GAA, South Asia Regional Office, S-41, Panchsheel Park, New Delhi - 110017	Mr. Joachim Schwarz (Regional Director-South Asia)			info.india@welthungerhilfe.de
19	DanChurchAid	14, Palam Marg, VasantVihar, New Delhi - 110057	Mr. Allan Duelund Jensen (Regional Repræsentant)	011-26148279	011-26148157	adj@dca.dk
20	International Committee of the Red Cross (ICRC)	ICRC Regional Delegation for South Asia, 47, Sunder Nagar, New Delhi 110003	Mr. Stamm François (Head of Regional Delegation)	011-42211000	011-42211068	del_new_delhi@icrc.org
21	Indian Red Cross Society	1 Red Cross Road, New Delhi-110001	Dr. S P Agarwal (Secretary General)	011-23716441	011-23717454	indcross@vsnl.com
22	Japan International Cooperation Agency (JICA) India	2 nd Floor, Dr. Gopal Das Bhawan, 28 Barakhamba Road, New Delhi-110001	Mr. Shinichi Yamanaka, Chief Representative (JICA-India)	011-47685500	011-47685555	
Relief Agencies having their offices outside India						
25	European Commission Humanitarian Aid (ECHO)	B-1049 Brussels, Belgium	Mr. Claus Sorensen (Director General)	+32 2 295 44 00		echo-info@ec.europa.eu
26	ACT Alliance	Ecumenical Centre, 150 route de Ferney, P.O. Box 2100, 1211 Geneva 2, Switzerland	Sudhanshu S. Singh (Regional Prog. Officer-Asia Pacific)	+41 22 791 6035	+41 22 791 6506	sudhanshu.singh@actalliance.org