Departmental Disaster Management Plan

State Disaster Management Authority

Uttarakhand

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ABBREVIATION

AWS	:	Automatic Weather Station
CMG	:	Crisis Management Group
CRF	:	Calamity Relief Fund
DDMA	:	District Disaster Management Authority
DEOC	:	District Emergency Operation Centre
ERS	:	Emergency Response System
ERT	:	Emergency Response Team
GPS	:	Global Position System
IDRN	:	Indian Disaster Resource Network
IPCC	:	Intergovernmental Panel on Climate Change
IRS	:	Incident Response System
NDMA	:	National Disaster Management Authority
NDRF	:	National Disaster Management Fund
RO	:	Regional Officer
SEC	:	State Executive Committee
SDRF	:	State Disaster Response Force
SDRF	:	State Disaster Response Fund
SEOC	:	State Emergency Operation Centre
SMS	:	Short Message Services
SOP	:	Standard Operating Procedure
USDMA	:	Uttrakhand State Disaster Management Authority

INTRODUCTION

The State Uttarakhand is a multi-hazard prone state due to its specific geographical, geological and climatic conditions. On one hand, the state is a favorite tourist hotspot of people as most of its area is hilly (86 per cent) and forested (65 per cent) and it has major contribution in the state's GDP while on the other hand, the state's sensitivity to different natural and manmade disasters is also manifested in form of flash floods, landslides and earthquakes. The increasing trend of above mentioned disasters have caused inconvenience to the local residents and also impacted the tourists and people who come for pilgrimage. This also imposing extra burden on the government to invest money for reconstruction and repair of the infrastructure.

Considering the above vulnerabilities, the state government has become proactive to strengthen the disaster management system in the state by empowering the operational centres, district administration and other institutions, capacity building of the state and district departments' community and other stakeholders.

In order to make the system sensitive to disaster management it is necessary that each stakeholder must have a clear understanding of their role and responsibilities during each phases of the disasters and proper institutional arrangement and coordination of other departments. Keeping this in mind, the State Disaster Management Authority (SDMA) has prepared the Departmental Disaster Management Plan of the Authority with cooperation of the Departmental Disaster Management Committee in compliance with Article 40 of the Department of Disaster Management Act, 2005.

The departmental disaster management plan has taken cognizance of DM Act 2005 and various guidelines, regulations and schemes issued at the central and state level, the SOPs and guidelines issued by the National Disaster Management Authority, best SOPs and Departmental Disaster Management Plan of different states of the country, and IRS guidelines. Apart from this, various information related to the departmental activities was collected through direct interaction with the department and district level officials. This departmental disaster management plan will help the department to work effectively in disaster situations.

OBJECTIVE

Following are the objectives for preparing a departmental disaster management plan for the State Disaster Management Authority –

- Assessing the risks of various hazards affecting the state.
- Aware community about disaster risks and disaster risk reduction measures
- Ensure technical-legal compliance of disaster risk reduction.
- Enhance departmental capacity for disaster risk reduction.
- Ready to respond effectively during any disaster.
- Allocation of responsibilities among the participating agencies/ departments.
- Effective monitoring and management of resources to know the status of existing resources and to assess their adequacy so that the shortcomings can be identified and removed from time to time.
- Ensure continuous coordination among all the agencies/ departments, voluntary organizations, industrial units during disaster so that effective integrated response is ensured.
- Promote traditional measures of mitigation along with modern technologies.
- Developing an early-warning system and preparing secure communication and information technology with a view to speeding up the response.
- Identify institutional strength and assess the need for capacity building and prepare implementation plan accordingly.
- Developing mechanisms for social security, monitoring and evaluation after the disaster.
- Ensure high level of preparedness in every phases of the disaster at all the levels for effective work.
- Establish the State Disaster Management Plan as an effective and efficient tool.
- Updating the State Disaster Management Plan at regular intervals, with lesson learned in the Disaster Management after every major disaster.

PLANNING STRATEGY

While preparing the Departmental Disaster Management Plan of the State Disaster Management Authority, geographical situation of the state, and changing trend of natural and man-made disasters and its potential impacts have kept in mind. The strategies adopted for preparing the plan can be seen under the following points –

- For developing common understanding about the standard operating procedures and departmental disaster management plan, an initial meeting was held with the key officials of the SDMA
- Various guidelines, regulations and schemes such as – Disaster Management Act 2005, the SOP and guidelines issued by the National Disaster Management Authority, best SOPs and Departmental Disaster Management Plan prepared for various disasters by different states of the country, and IRS guidelines – were examined.
- Current Institutional arrangement from state to district and the spatial pattern of disasters in districts were discussed in the meetings with the State Disaster Management Authority.
- Sample districts were identified to understand vertical and horizontal linkages in disaster management initiatives
- Sample Districts were visited and meetings were held with the officials and the community. Efforts were made to understand the departmental activities with time line (before, during and after the disaster), role and responsibility of officials/workers responsible for executing the activities. In addition to this the physical resources available in the department, abilities and weaknesses were also discussed.
- Collected data on damages/ losses due to disasters, human resources, plans/ policies and finance etc.
- Community consultations in sample districts to understand the nature of disasters, their perception and adaptation measures adopted by the community
- The first draft of the Disaster Management Action Plan was prepared and shared with the department to get feedback on the plan.
- In a joint meeting of the State Disaster Management Authority, this disaster management plan was reviewed and based on the suggestions receives, it was revised and the final draft of the disaster management plan was submitted to the Disaster Management Committee for the recommendation.
- The Department submitted the approved disaster management plan to the State Disaster Management Authority.

1. INTRODUCTION

1.1 BRIEF INTRODUCTION AND WORK OF THE DEPARTMENT

In 2000, the state separated from the Uttar Pradesh and became a separate state. But the State Disaster Management Authority in Uttarakhand was set up and notified as per sub-section (1) of section 14 of Disaster Management Act 2005 Uttarakhand in 2007. It is part of State Government and is a nodal agency for planning, co-ordination and monitoring activities related to disaster prevention, mitigation, preparedness and management.

The Uttarakhand State Disaster Management Authority, constituted in compliance with the Disaster Management Act 2005, is part of the State Government, which is primarily focused on planning disaster prevention, mitigation, preparedness and management, establishing coordination with the departments and monitoring the tasks. According to Section 18 of the Disaster Management Act 2005, Uttarakhand State Disaster Management Authority also works towards making policies for the state in relation to disaster management. Under the directions of the National Disaster Management Authority, the District Disaster Management Plan for the districts and the Departmental Disaster Management Plan for departments at the state level is recommended and the responsibility for coordinating of implementation is on the State Disaster Management Authority. It sets guidelines for the work done by the government for reduction, capacity enhancement and preparedness and also issues guidelines from time to time when necessary to review the methods of work.

In the state of Uttarakhand, the State Disaster Management Authority is constituted under the chairmanship of the Chief Minister. The responsibility of management of various types of disasters is with the State Disaster Management Authority, which works as a nodal office for disaster management in the state. The implementation and monitoring of disaster management activities in the state is done by the Secretary, Department of Disaster Management. In the event of emergency, the task of identifying various nodal departments is done by the Secretary, Department of Disaster Management. The following are the key tasks performed by the State Disaster Management Authority –

- All aspects of disaster management for Uttarakhand – to work out the assessment, planning and implementation of schemes related to prevention, mitigation, preparedness and response.
- Ensure better coordination between district, state and centre during the course of the disaster.
- In the whole of Uttarakhand, covering all the units and agencies of the government, creating a uniform control, direction and coordination framework so that in case of emergency, Preparedness mitigation and prevention activities can be smoothly modified.

1.2 NATIONAL CONTEXT OF DISASTER MANAGEMENT

Taking the context of disaster risk reduction, India has committed in Sendai framework and SDGs to prepare disaster management plan at all level with DRR and CCA integration. The Uttrakhand state disaster management authority also recognizes that the state should incorporate disaster risk reduction component in each aspect of development, schemes and departments to respond effectively in any disaster.

Main points of the Sendai Framework:

- There will be substantial reduction in the global disaster rate by 2015-2030.
- By 2015-2013, there will be adequate availability of information related to the multiple disaster warning mechanism, disaster risk information and assessment, and it will be ensured to be delivered to the people from time to time.
- In relation to the global GDP, the direct economic loss from the disaster will be reduced.
- The basic amenities like health and education facilities will be optimized for climate change and there will be substantial reduction in the loss of basic infrastructure due to disaster.
- In the 2020-2030s compared to 2005-2015, the goal of keeping the number of people affected by disaster to 1 lakh will be met.
- By 2015-2020, there will be substantial increase in the number of countries adopting national and local disaster risk reduction strategies.
- With adequate and sustainable cooperation to operate the national level activities for the implementation of this framework, there will be substantial increase in international cooperation with developing countries.

To effectively implement the objectives and main points given under the Sendai Framework and to implement the framework, it was necessary that some specific activities should be conducted at the local and national level. In this context, four priorities were fixed under the Sendai Framework, which are as follows –

Four Priorities of the Sendai Framework –

I. Develop understanding on disaster risk

Disaster Risk Reduction policies and practices should be made only after understanding the sensitivity, capacity, persons affected by disaster, all aspects of the danger and all aspects of the environment. While working on policies and practices, prior to disaster risk assessment, there should be some information on prevention and mitigation, development and effective

preparedness and on the implementation of effective feedback related activities during the disaster.

II. To strengthen the administration to administer disaster risk

For effective and efficient management of disaster risk, clear guidelines and administration related to disaster risk at national, regional and global levels are very important. It is also necessary to involve all relevant stakeholders with clear vision, planning, capacity, direction and coordination both in and out of all areas. It is necessary to strengthen the disaster risk administration for prevention, mitigation, preparedness, response, rehabilitation and reconstruction. At the same time, it promotes collaboration and partnership between mechanisms and institutions for disaster risk reduction and sustainable development.

III. Investing in disaster risk reduction for resilience

Public and private investment in disaster risk prevention and mitigation through structural and non-structural activities to increase the economic, social, health and cultural resilience of the individual, community and their properties as well as to enhance environmental resilience. They can be carriers of innovation, growth and employment generation. Such measures are effective and helpful to save lives, prevent and reduce losses and ensure effective resettlement and rehabilitation.

IV. Enhancing disaster preparedness for effective response and incorporating "towards better return" in resettlement, rehabilitation and reconstruction

Experiences from past calamities and the continuous increase of disaster risk, loss of people and property, these all together indicate that there is a need to further strengthen disaster preparedness and response. In view of the incidents, work has to be done to integrate feedback and pre-preparedness in disaster risk reduction. Along with this, effective reactions on the spot and the immediate rehabilitation at all levels will ensure the capacity addition. Empowering women and people and bringing community leadership to the fore and increasing gender equality. Regular rehearsals will be organized on the steps of pre-preparedness, prevention, mitigation, reaction, resettlement and rehabilitation, so that all the steps can be effectively modified in the event of a disaster.

1.3 EXECUTIVE COMMITTEE OF THE AUTHORITY

Using the given powers in Sub-Section (2) of Section 14 of State Order No. 1198/XVIII (2)/07-3(6)/2007, Disaster Management Act 2005 (Central Act No. – 53, year 2005), the Governor, hereby constitutes "Uttarakhand Disaster Management Authority" in the following form –

- Chief Minister – President (Ex-Officio)
- Disaster Management Minister – Vice-President
- Medical and Health Minister – Member
- Drinking Water and Irrigation Minister – Member
- Transport Minister – Member
- Rural Development Minister – Member
- Chairman of the State Executive Committee (Chief Secretary) – Member and Chief Executive Officer (Ex-Officio)
- Chief Secretary – Finance – Member
- Chief Secretary – Disaster – Member

2. HAZARD, RISK, VULNERABILITY AND CAPACITY ASSESSMENT

2.1. THE NATURE AND INTENSITY OF DISASTER AT THE STATE LEVEL

UTTARAKHAND: AN INTRODUCTION

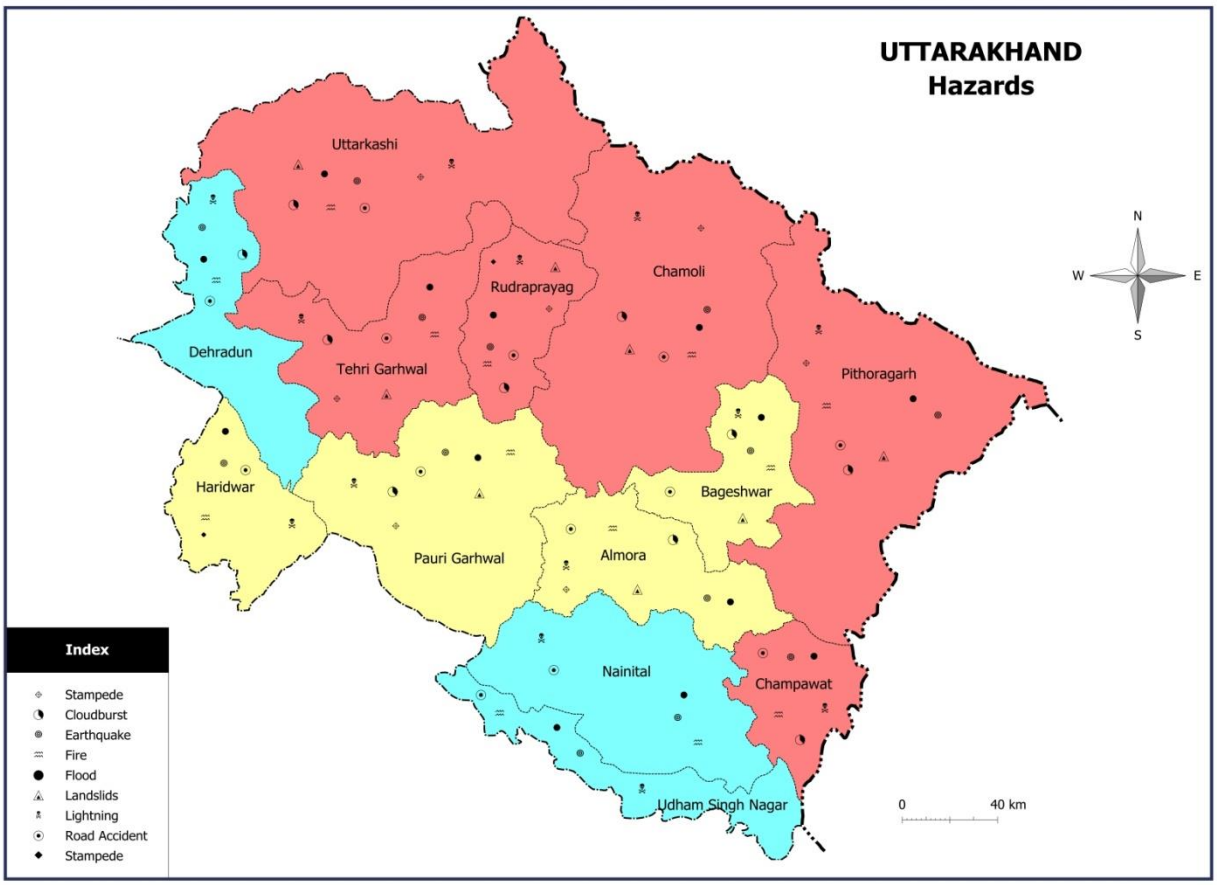
Uttarakhand is a hilly state in the Indian Himalayan region. Earlier, it was a part of Uttar Pradesh. On 9 November 2000, 13 hilly states of Uttar Pradesh were constituted together to form Uttrakhand as the 27th state of India. Located between 28°43' - 31°27' Northern latitude and 77°34' - 81°02' Eastern longitude, Uttarakhand is situated in the northern region of India. Uttarakhand has a total area of 53483 km² and it is spread 301 km. in the east-west direction and 255 km. in the north-south direction. It is surrounded by China (Tibet) in the north, Nepal in the east, Himachal Pradesh in the west and northwest and Uttar Pradesh in the north. The state has 13 districts which are divided into two administrative units – Garhwal and Kumaon. Generally, the northern-western part of the state comes under the Garhwal unit and the south-eastern part comes under the Kumaon unit. There are seven districts under the Garhwal unit – Dehradun, Haridwar, Uttarkashi, Tehri, Paudi, Rudraprayag and Chamoli and six districts fall under the Kumaon unit and they are – Pithoragarh, Bageshwar, Almora, Nainital, Champawat and Udhamsingh Nagar. Uttarakhand is primarily a Hindi speaking state.

Map 1 : State map with district's boundaries

Uttarakhand is recognized as most sensitive states in terms of natural disaster including climate-related risks. Particularly, mountainous areas are highly sensitive due to climate change and in the twentieth century, the state has been experiencing "more heat than average." According to the

assessment report released by the Intergovernmental Panel on Climate Change (IPCC), (A.R.5), due to glacier melting in the Himalayan region, the incidence of flood in this area will increase, which will have a significant impact on water resources in the coming decades.

Since the year 1816, the state of Uttarakhand has witnessed many hydro-met disasters. But in term of intensity and frequency of hydro met disasters, the mid-19th century period was worst. The years 1970, 1986, 1991, 2001, 2002, 2004, 2005, 2008, 2009, 2010, 2012 and 2013 was notable in terms of natural calamities for the state. With these disasters, the state suffered heavy losses and estimated loss of several million rupees, thousands of people lost their lives and a large number of animals died.[1]



Map 2 : Vulnerable districts due to different disasters

Hydro met Disasters

The following disasters mainly fall under hydro met disasters –

- flash flood/flood
- Heavy rain
- Cloud burst
- Loo and frost conditions
- Avalanche

[1] DMMC

- Drought
- Thunderstorm and lightning

Geological Disasters

In addition to the hydro met disasters, there are some disasters that are the result of movements inside the Earth, such as –

- Landslide
- Earthquake
- Dam breaching /dam flows away

Man-Made Disasters

Other than natural disasters, there are certain disasters which are the result of human activities, such as –

- Stampede
- Road accident
- Forest fire

DAMAGE IN THE STATE OF UTTRAKHAND

In the last 10 years, the state experiences huge monetary losses/ damages caused by various disasters, it is said that every district of the state has been affected by disasters. However, there is spatial variation among the districts. The state suffered the most in 2007, 2009, 2010, 2012 and 2013.

2.2. CLIMATE CHANGE, ADAPTATION AND DISASTER RISK REDUCTION

Climatic condition in the State

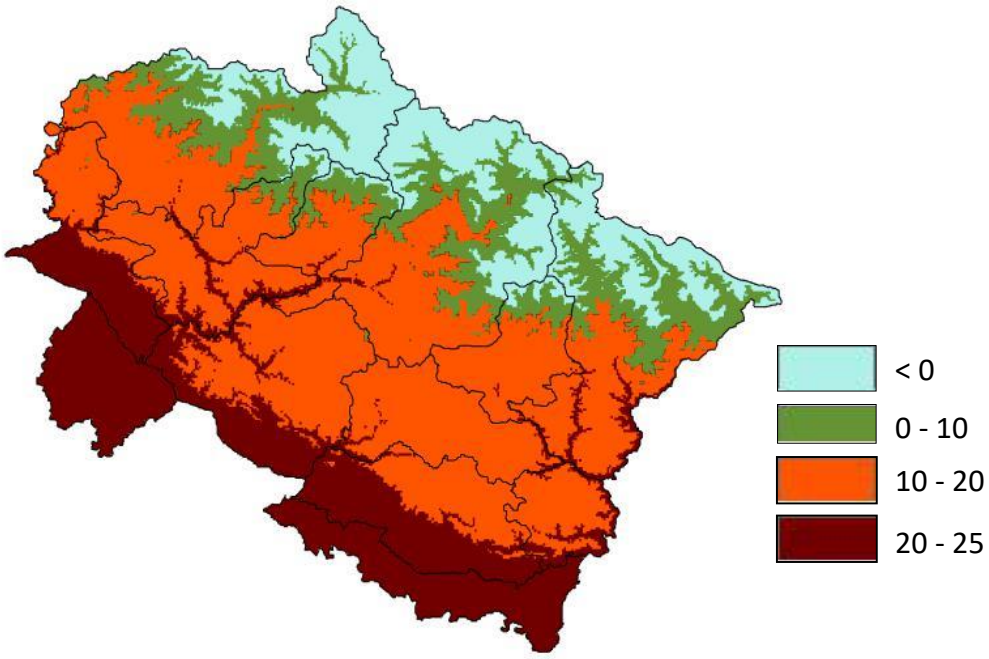
The state is mainly divided into two climate regions. Majority of the state's area is hilly while some area is plain. The climate in the plain area is somewhat similar to the climate in other plain areas of the country. There are prolonged winters and even snowfall in the hilly areas. The state experiences a good quantity of rains during the monsoon season and light showers during the summers.[2] The average annual rainfall in the state is 1229 mm.[3] Generally, the rainy season starts at the end of April in the state and it continues till September. There is heavy rainfall between June and September. Maximum rainfall occurs during the first week of July and there is continuous rainfall from August till the first week of September. It is hottest in the plain areas of the state wherein they experience humid summers and the temperatures go higher than 40°C. Winters are exceptionally cold and the temperatures dip below 5°C. The lowest temperature recorded in the state has been -5 to -7°C.[4] There is a marked

[2] SAPCC 2014
[3] State Disaster Management Action Plan for the state of Uttarakhand
[4] uk.gov.in (Directorate of Economics & Statistics)

difference in the climatic conditions of the areas situated on the highest hill in the state and the lower regions. Not only does the difference in temperature appear during different seasons, but differences in temperature are also displayed at different altitudes. Uttarakhand is situated on the southern slope of the Himalayan range. From the glacier at the highest altitude to the sub-tropical forests located at the lowest altitude, there is a marked difference in the climate and vegetation. In the upstream Gangetic plains, there are humid forests and there are savannas and grasslands in the dry lowlands.

The average annual rainfall of the state varies spatially. For example, the average annual rainfall in Srinagar (Garhwal) is 920 mm while the same in Nainital is 2500 mm. However, the distribution and variation of rainfall depends on the geographical location, slope and nature of the space. Generally, there is high rainfall in low-lying areas like Nainital and Dehradun, which gradually decreases with the increase in height. Three-fourths of the entire rain occurs during the monsoon season while the remaining one-fourth is spread over other seasons. Generally, rains start here from the third week of June, which continues till July/August.[5]

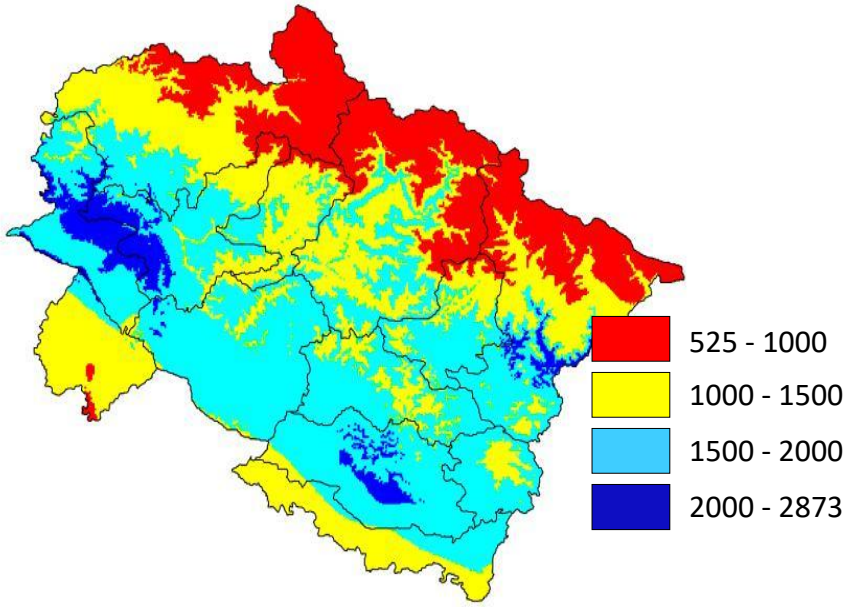
Map 3 : Annual average Temperature (in ^{0}C)



Source : Uttarakhand State Action Plan on Climate Change, 2014

[5] SAPCC 2014

Map 4 : Annual average Rainfall (in mm)



Source : Uttarakhand State Action Plan on Climate Change, 2014

Trend of Climate Change and Climate induced Challenges

Climate change is the main global, environmental and developmental problem. Although all possible outcomes of climate change have not been understood yet, nevertheless, it has now been established that due to extreme weather events, floods and droughts, sea level rise and extreme climatic differences, there is a large possibility of adverse effects like the inundation of coastal areas frequent flooding / waterlogging etc. Based on information and projection made in different studies, it is predicted that there may be a significant chnages in the weather parameters from one place to another. The impact of climate change is also manifested in the Uttarakhand and marked variation is being noticed in seasonal pattern. For example, in the entire plains including Pantnagar, the trend of rainfall is in increasing order and the maximum temperature is decreasing. Based on the temperature data available of the last 53 years (1955-2007), it is seen that temperature is rising in a low hill station like Almora. This data indicates that the 17.55°C average annual temperature of Almora has increased by 0.46°C during the last 53 years. This initial observation indicates that the average temperature in the state is increasing. Similarly, on the basis of the rainfall statistics of the last 53 years (1955-2007), it was seen that rainfall has reduced in Almora. Observing the normal monthly distribution of rainfall in the region shows that maximum rainfall occurs in the month of July.[6]

[6] SAPCC 2014

The following changes are seen in the climate scenario of the state –

- Annual rainfall is decreasing and become erratic
- The availability of surface and ground water is decreasing.
- There has been a reduction in the average rainfall during winters.
- Incidents of heavy rainfall in short time durations become conspicuous and increasing.
- The outbreak of vector borne diseases is increasing.
- There is continuous increase in the average annual temperature.
- The number of winter/cold days is decreasing, the winter days are becoming hot and there is reduction in snowfall.

Future Climate Change Projection

According to the Uttarakhand State Action Plan on Climate Change, the annual temperature will increase by 0.7°C by the year 2030. In comparison to the year 1970, an increase of 1.7°C-2.2°C has been registered in the temperature. There is also an estimation of growth in seasonal air temperature in all seasons.

According to the PRECIS Model, the annual rainfall in the state can fluctuate, i.e., the annual rainfall of the state may be 1268 mm to 225.2 mm less or more and maximum 1604 mm to 175.2 mm less or more. According to these estimates about rainfall, the state is expected to get 60 mm to 206 mm more rainfall in the year 2030. That is, by the year 2030, the state's annual rainfall is expected to increase by 5-13 per cent. All the regions of the state are expected to get more rainfall in all seasons and there is also a possibility that there may be more than 12 mm increase in rainfall in the months of June, July, August and September. Whereas there is an expected increase of 5 mm in the rainfall occurring in the winter season months of January and February. In the months of October, November and December, minimum increase in volume will be recorded. According to the model, there is a chance of more than 50 per cent increase in the extreme heavily rainfall of some areas/regions of the state by the year 2030. There is also a chance of a 2-12 per cent increase in the rain intensity in the Himalayan region.[7]

State's Sensitivity/Vulnerability in context to Climate Change

Due to its geographical conditions, the state of Uttrakhand comes under the category of multi-disaster affected states. There is an outbreak of floods, flash floods, avalanche, landslides, earthquakes, droughts, forest fires and general fire, hailstorm, thunder, road accidents etc. in the state, but earthquake and landslide are the main disasters here. It is worth considering that one-fourth of the state's area comes in Seismic Zone 5 in terms of earthquake. If the state is compared to other states at the national level, then Uttrakhand is one of the first five states in the country in terms

[7] SAPCC 2014

of natural hazards, namely earthquake, flash floods due to cloud burst, landslides, avalanches, forest fires and recurrent drought disaster in the summer. With these recurrent calamities/ disasters, there is a great loss of natural resources, basic infrastructure and human life in the state. Although the intensity of earthquake in Uttarakhand in the year 1991 and the intensity of earthquake in 1999 in Chamoli was less but in the coming days, it was likely to become a major hub of earthquake. The growth of population and the infrastructure development has increased the state's sensitivity in the context of earthquake which was revealed in 2015.

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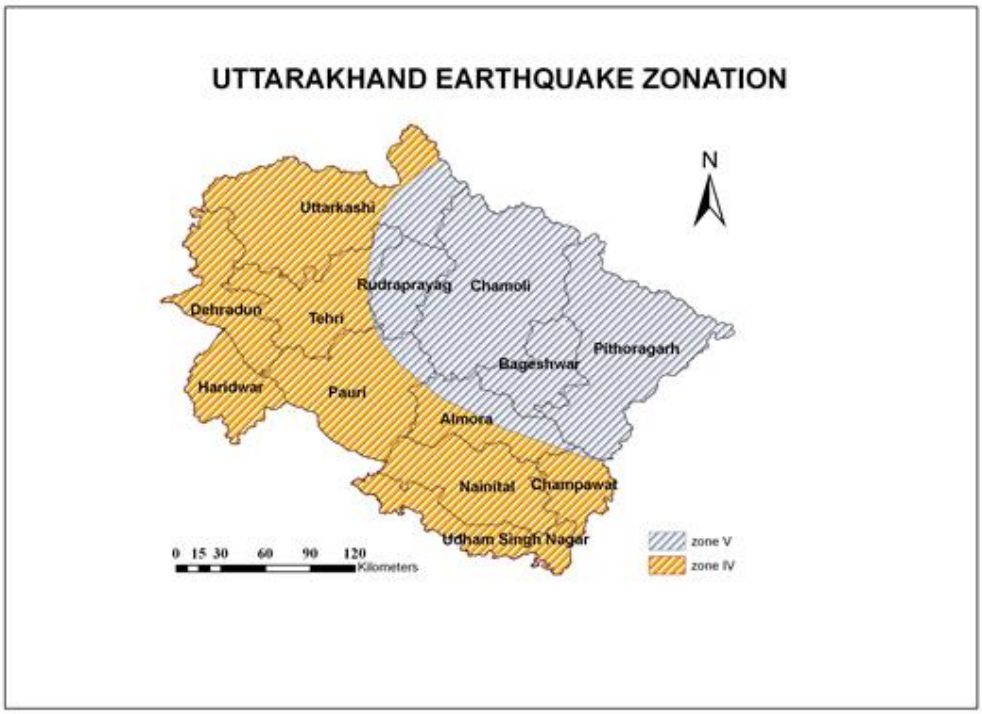
State Sensitivity/Vulnerability in Relation to Various Disasters (Flood, Heavy Rainfall, Earthquake, Landslide etc.)

Here are some key points of state's sensitivity/vulnerability to note –

- According to Vulnerability Atlas of India, approximately 56 per cent of houses in Uttarakhand are made of clay, raw bricks and stones. The above data also shows the state's very high sensitivity in disasters like earthquake, landslide, flash flooding and cloudbursts. Uttarakhand is lies on the fault line 1934 Bihar-Nepal earthquake and the 1905 Kangra earthquake and it comes under the seismic zone 4 and 5. According to the figures in Sensitivity/Vulnerability Atlas India , this state comes under the most seismic risk areas of the country.[8]



Map 5 : Uttrakhand Earthquake Zonation map

[8] Vulnerability Atlas of India

- The frequency of landslide incidences in the state has increased erratic rainfall events, deforestation, road construction and other construction works. Now almost the whole hilly areas of the state is experiencing landslide disasters every year, which causing extensive damage to life and property, agriculture land gets ruined, losses of means of transport and communication etc. The major landslide disasters in various parts of the state in was noticed in the years 1979, 1986, 1998, 2002, 2004, 2008, 2009 and 2013.[9]

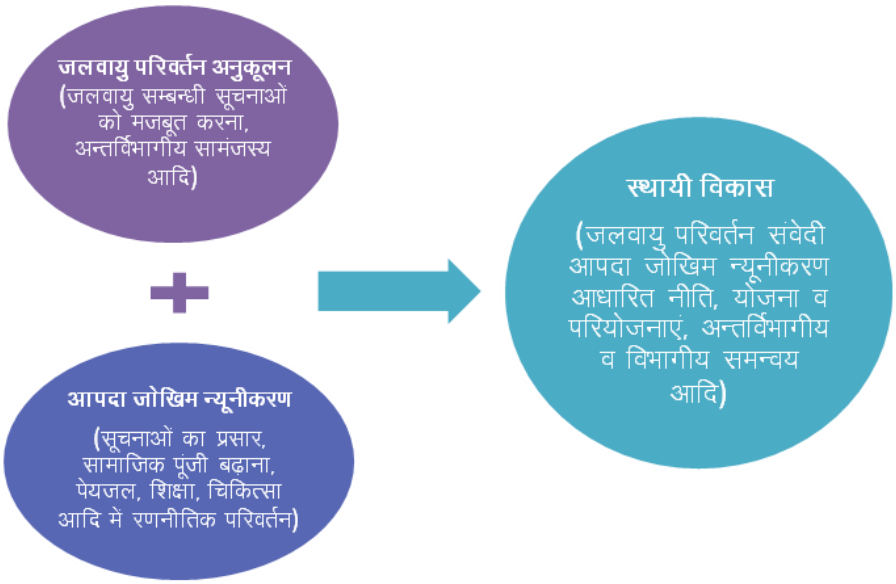
- Usually, the onset of monsoons in the state is at the end of April which continues till September. Due to heavy rainfall from June to mid-September, there is a flood situation in the low-lying areas and there is soil erosion in the entire state. Due to the continuous cutting of trees/forests in the Himalayan region, there have been increasing instances of floods in the monsoon season and in other days, the state has to face drought conditions. Due to continuous soil erosion, the water holding capacity of the rivers is dwindling, resulting in flooding of the rivers in the plain areas due to the rising surface of the rivers.
- In the case of excessive heavy rainfall, due to occasional cloudbursts and mountainous streams, cases of sudden flash floods and dam break have also increased in recent years in the state. Although, this does not happen on a regular basis. Yet there were major incidents of cloudburst in the state in the years 2002, 2004, 2007, 2008, 2009, 2010 2012, 2014 and 2016.[10]
- Due to excess rainfall in a short span of time, some regions of the state experience disasters such as flash floods, landslides and floods. In the case of excessive rainfall in the upper reaches of the mountains, the water rapidly makes it way down to the lower areas. The strong gush of water brings sludge, dirt and rocks in its wake. The flow of water is so strong that people do not get a chance to handle themselves and these flash floods cause more damage compared to usual floods.
- Increasing incidences of drought in the state, is the result of both man-made and natural factors. Due to climate change, the state is not receiving normal rainfall because of which it is facing drought like conditions. In the last few years, it has been observed that due to some man—made activities such as soil erosion, deforestation excessive tapping of ground water, pollution etc. the conditions of drought are aggravating.

In addition to the above disasters, the increasing vulnerability the state is also due to social, physical, environmental and economic capacity of the people. Increasing urbanization, lack of awareness and limited capacity to deal with disasters within the community, weak administrative structure and poor connectivity of remote hilly areas with road infrastructure, all these factors are the main bottlenecks to promote effective response

[9] SEOC/DMMC
[10] SEOC/DMMC

CLIMATE CHANGE ADAPTATION AND DISASTER RISK REDUCTION

Considering the state's sensitivity towards the disasters and the nature of climate change, it is inevitable that there will be a change in the nature of disasters in the coming days, the vulnerability of the state will increase and along with development process.,. In such a situation, the State Disaster Management Authority will need to look at renewed efforts for disaster risk reduction. Considering the developmental stability of the state, the Authority, on one hand, will have to talk about adaptation to climate change, then on the other hand, disaster risk reduction will also be given a new look, which can be understood through the following diagram –



2.3 INSTITUTIONAL SYSTEM AT DIFFERENT LEVELS

Uttarakhand State Disaster Management Authority coordinates from the state to the district level. At various levels, its institutional mechanism and coordination can be considered as the following –

Three tier Institutional arrangements (National, State and District) have been provisioned under the National Disaster Management Act, 2005 to respond and adopt mitigation measures to reduce the impact of disasters. With the enactment of the Disaster Management Act 2005, the National Disaster Management Authority (NDMA) was constituted. The NDMA's approach involving all stakeholders is to develop a "safe and calamity-resistant India" with a holistic, active, technology-based strategy and promote the culture of prevention, preparation and mitigation. Considering the importance of disaster management as a national priority, the Government of India constituted a high-level committee for the development

of the NDMA in August 1999 and the National Committee was formed after the earthquake in Gujarat. Its purpose was to recommend effective mechanisms to reduce disaster plans and disaster. The Tenth Five Year Plan and the 12th Finance Commission were focused on the causes of disaster prevention. In the end, on 23 December 2005, the 12th Finance Commission reviewed the financial system for disaster management. Subsequently, the National Disaster Management Authority was constituted under the chairmanship of the Prime Minister, the State Disaster Management Authority was constituted under the chairmanship of the Chief Minister and the District Disaster Management Authority was constituted under the chairmanship of the District Magistrate. At the three levels, the disaster management system and its function can be understood through Table 1 –

Table 1: Disaster Management Authority System and Task

Disaster Management System	**Main department**	**Task**
At the national level	National Disaster Management Authority	NDMA was constituted for better coordination of disaster management at the national level. It is a multi-disciplinary body with the nodal officers of all the concerned departments/ministries/organisations. In addition to these institutions, the Ministry of Disaster Management, Government of India, prepared a National Contingency Plan. Simultaneously, the National Emergency Operations Centre, including all the necessary equipment and state-of-the-art technologies for disaster management, has been started under the aegis of Home Ministry.
At the state level	Uttarakhand State Disaster Management Authority	Uttarakhand State Disaster Management Authority has been constituted under the chairmanship of the Chief Minister in which the ministers of the respective departments are the members. The Disaster Management Department is responsible for the guidance of disaster related matters, Preparedness, mitigation, relief, rehabilitation, restoration etc. work in Uttarakhand. The Chairman of the Executive Committee on Disaster Management in the state of Uttrakhand is Chief Secretary, Uttrakhand.
At the district level	District Disaster Management Authority	The District Disaster Management Authority has been constituted under the chairmanship of the District Collector/Magistrate of the concerned district. The District Disaster Management

		Authority is responsible for executing preparedness, mitigation, relief, rehabilitation, and restoration measures in different phases of disaster – under the guidance of the state disaster management authorities.

Institutional Framework at the National Level

National Disaster Management Authority

According to the Disaster Management Authority Act 2005, a National Disaster Management Authority will be constituted comprising a total of nine members including a Chairman and eight members. Some key points related to the National Disaster Management Authority are listed below –

- The Prime Minister of India will be the Ex-Officio Chairman/President of the National Authority.
- The Chairman will suggest the names of the other members. There will not be more than nine members.
- Under section (E) of sub-section (2), one member of the nominated member shall be posted as Vice President of the National Authority.

National Disaster Management Plan

The National Disaster Management Plan works to provide all government structures and guidelines for all phases of the management cycle. That National Disaster Management Plan is a "dynamic document" which means it will be made better from time to time, covering the various trainings and activities being done globally in the field of disaster management. The National Disaster Management Plan speaks of minimizing the losses due to the disaster, and also explains which activity will be performed in which stage and under whose direction will it be carried out. Various stages of disaster management in the National Disaster Management Plan like prior preparation, mitigation, response, restoration and rehabilitation activities will be expanded in a standardized manner.

Institutional Framework at the State Level

State Executive Committee (SEC)

According to Sub-Section (1) of Section 20 of the Disaster Management Act, 2005 (Central Act No. 53, 2005), arrangement for the formation of an Executive Committee has also been made to perform the tasks of the Disaster Management Agency in the state smoothly. According to the same, in light of Order No. 141/XVIII2)/08-3 (6)/20017, 8 January 2008, the State Executive Committee was constituted as follows –

Chief Secretary – President
Additional Chief Secretary – Member
Chief Secretary, Finance – Member

Chief Secretary, Disaster Management – Member
Chief Secretary, Medical and Health – Member

In addition to this, 4 special invited members will be present in the meetings of this Executive Committee, whose description is as follows –

1. Chief Secretary, Home
2. Secretary, Public Works Department
3. Secretary, Irrigation Department
4. Divisional commissioner _, Kumaon and Garhwal Mandal

According to Section 22 of the Act, the State Executive Committee will perform the following tasks to support the State Disaster Management Authority –

- Control and prohibit vehicles which pass through or move within sensitive and affected areas.
- Control and block any person's movement and any type of activity in sensitive or affected areas.
- To remove debris, operate the search work and complete the rescue work.
- According to the norms set by the National and State Disaster Management Agency, the affected people will be provided shelter, food, drinking water, necessary management, health services etc.
- According to the local boundaries of the State Government, for the purpose of saving and evacuation of human lives and property, it will take steps to direct the concerned institutions, district agencies and other agencies of the state government to take necessary steps.
- If necessary, the purpose of emergency response, rescue and relief will be to make relevant changes to any department of the state government, agency or any resource person to provide resources.
- Meet the needs of experts and consultants to provide support and advice for the relief and rescue operations.
- If required, the committee will procure exclusive or preferential use of facilities from any agency or person.
- Destroying dangerous unsafe structures for the public and creating temporary bridges and other necessary structures.
- The Committee will also ensure that the voluntary organizations present in the area take the activities of the State Disaster Management Authority forward in a proper way.
- To deal with disaster situations or public disaster, the public will broadcast information.

State Emergency Operation Centre (SEOC)

At the state level, the State Emergency Operation Centre is being operated 24 hours every day of the week in the office of the Uttrakhand State Disaster Management Authority. The emergency telephone number for the

State Emergency Operation Centre is 1070. The State Emergency Operation Centre will be in coordination during any natural and man- made disasters. Along with this, it will also work to notify the Response Officer (RO) to maintain continuous communication with all levels and the community. The State Emergency Operation Centre will be equipped with a trusted communication system (telephone, radio communication etc.).

Objectives for the establishment of State Emergency Operation Centre:

Emergency Operation Centre, established at the state and district level, is an important centre for disaster management and coordination. The main objective of the State Emergency Operation Centre is to issue the following directions to all the executive departments/agencies and maintain control –

- Receive early warnings in terms of disaster from the main agency and other sources and pass them along to all concerned officials.
- Monitor emergency operations.
- Establish coordination between the main and associate departments.
- Demand for additional resources during the disaster period.
- Issue specific information/notices regarding disaster/incident and related instructions.
- Collect, analyse and disseminate data related to loss, damage and required assessment.
- Send a consolidated report to all authorized officials.

Main Responsibilities

- Coordination with various local technical agencies issuing early warnings of various hazards/ disaster.
- It will set up a system with the media under which the media will ensure the transmission of information.
- Creating awareness among the concerned beneficiaries, including community and police department, on the urgent activities being carried out during the communication system for the early warning and especially during the disaster.
- Ensure the discharge of responsibility of all departments/officers/employees related to the disaster response system.

Institutional Framework at the District Level

System at the District Level

According to the guidelines given in the Disaster Management Act 2005, the District Disaster Management Authority has been constituted at the district level. Based on the requirement, relief is provided by the Disaster Management Department. At the district and state level, the involvement of the District Magistrate is necessary at the time of response and rehabilitation.

District Disaster Management Authority (DDMA)

A District Disaster Management Authority is established in each and every district. The Authority constituted under the Chairmanship of the District Magistrate. There shall be seven members as per the guidelines laid down by the State Government and the Disaster Management Act. For the smooth functioning of the District Disaster Management Authority, arrangements have been made for the formation of the Executive Committee under the chairmanship of the District Magistrate. The organizational structure of the District Disaster Management Authority is as follows – the structure of the Executive Committee is as follows –

1) District Magistrate – Ex-Officio Chairman
2) President, Zila Parishad – Co-Chair
3) Police Superintendent – Ex-Officio Member
4) Chief Medical Officer – Ex- Officio Member
5) District Development Officer – Ex-Officio Member
6) Sub Divisional Magistrate (Finance/Revenue) – Ex-Officio Member
7) Senior engineers of the district – Ex-Officio Member

Upper District Magistrate (Finance/Revenue) will be the Chief Nodal Officer of the District Disaster Management Authority.

DDMA is primarily responsible for preparing the District Disaster Management Plan, identifying vulnerable sites in the context of different disaster within the district, coordinating with national and state level different schemes in terms of disaster management, coordinating with all the respective departments at the district level at various stages of disaster, if necessary, to issue guidelines of departments to adopt measures for the prevention and mitigation of disaster etc. Along with this, monitoring of the work done by the departments in different phases of the disaster is also a major task of the DDMA.

District Emergency Operation Centre (DEOC)

Generally, the District Emergency Operation Centre, established in the District Disaster Management Authority office, is equipped with various information, technology based state-of-the-art equipment, computed with Internet facility etc. This Centre, which is function 24 hours all seven days, is operated through the district administration. This Centre has all the facilities like rescue kits, wireless etc. Along with this, it is equipped with facilities like ham, early warning system etc. The District Project Officer is in-charge of this Centre and she/he works under the direction of the Additional District Magistrate (Finance/Revenue).

This DEOC is connected to all the governmental departments. Inventory of resources and information related to all departments is uploaded on the network of information and technology in which information related to available human and physical resources, their area of work, vehicles, other equipment etc. with firefighters, police department, health department, food

and supplies department, city council, transport department, public works department etc. This inventory is very important and helpful in relation to adequate availability of resources at the district and state level at the time of emergency.

2.4 DEPARTMENTAL CHALLENGES AND AREAS OF IMPROVEMENT

In addition to the coordination between the main departments, there are some other issues related to the department, on which the officials of the state and the district level need to meet jointly in order to reach at a solution. In reality, these challenges are related to the human resources, the technical capacity of the staff and the absence of infrastructure, due to which both the response time and the quality of service during the disaster are affected. In view of multi disasters and disaster preparedness, response to disaster and restoration and reconstruction work after disaster, the following are the challenges before the Uttarakhand State Disaster Management Authority on which the Authority needs to work –

Issues and Challenges

- Information on human and material resources available within the department is not available on time.
- Risk and damage estimation by the departments is not available from time to time.
- The state's resource inventory is not updated from time to time.
- There is no strong warning system in the state.
- Due to frequent change of nodal officers, effective departmental coordination not achieved.

Steps to be taken to Combat Challenges

To combat these issues and challenges, some steps should be taken immediately at the departmental level. These steps are as follows –

- Meetings should be organized from time to time to establish coordination with the departments.
- Recommendations for increasing the amount of money in the maintenance of the department for disposal of various types of mitigation measures on priority basis.
- Strengthen the early warning system in the state.

3. MEASURES TAKEN BY THE DEPARTMENT AT DIFFERENT STAGES OF DISASTER

The State Disaster Management Authority is primarily responsible for the prevention, mitigation and management of various types of disasters affecting the state. The Uttarakhand State Disaster Management Authority was formed with the aim of improving the activities to be performed to manage the disasters. From previous experiences, it was felt that many departments need to come together for quick response or relied rescue operations to the disasters, but all the departments work with their own plan of action, hence during the disaster, a situation of mis-management arises. Therefore, it is very important to establish coordination among all the departments. From this point of view, the Disaster Management Authority is also a major department because it periodically releases guidelines and suggest various departments in all the three phases of the disaster. The Disaster Management Authority works on the monitoring of the main three aspects – coordination with the departments, capacity enhancement of the community and departments in the context of disaster and the preparedness and mitigation activities done by the department. In this section of the document, the scope of the activities of the Authority in different stages of disaster is discussed in detail.

3.1 PRE- DISASTER ACTION (PREVENTION, MITIGATION AND PREPAREDNESS)

To reduce the effects of any disaster, prevention, mitigation and preparedness measures and preparedness activities proved to be very effective. Pre disaster actions are long term measures and which can be incorporated with the developmental activities of the department. In this direction, it should be mandatory to integrate DRR components in the department's routine developmental activities.

Activities to be carried out under prevention, mitigation and are as follows –

Identification of Vulnerable Areas and Planning

Planning for prevention and preparedness to disasters is a necessary component. Identifying vulnerable areas/districts based on vulnerability assessment and working on priority basis in those areas is an effective step towards reducing the effects of the disaster. The vulnerability of the region or district has been determined on the following grounds –

- Based on the statistics/ data provided by the department on disaster incidents and the damage caused by them –areas where the incidence of disasters has happened repeatedly are the most sensitive areas/districts.
- On the basis of available resources – In areas/districts where the required resources are not available in adequate quantity to the

department, the area belongs to the sensitive area in terms of disaster.

- Areas distant from the main route – Areas where there is no accessibility facility or where there is no road facility. Generally, such areas are more sensitive than those equipped with roads.

The following preparations will be required to deal with the disaster for the identified sensitive districts/areas on the above grounds –

- Preparation of the State Disaster Management Plan and the Response Plan with the participation of all the main departments.
- Ensure effective coordination between national and state level policies and district plans.
- Supporting district to develop multi hazard district disaster management plan
- Monitoring and supporting district administration in implementation of the District Disaster Management Plan at the sub state level.
- Develop necessary guidelines and suggest mitigation measure to reduce the impact of the disaster to various departments at the state and district level and provide them technical support for this.
- Review the development plan of the line departments and other local authorities from DRR lens and suggest necessary provisions to include disaster reduction and disaster management measure in developmental plan.
- Through the DDMA, convening meetings periodically in order to include the elements of disaster mitigation and disaster management in the development programmes.

Infrastructure Strengthening and Human Resource Development

Considering the nature of disasters in the state of Uttarakhand, it is necessary to ensure structural restructuring and adequate system of human resources in the development schemes within the department. Under this, the activities undertaken by the department, on one hand, where strengthening of departmental buildings/staff qaurters has been discussed, on the other hand, the department has discussed the need to increase the capacity of the work while eliminating the shortage of human resources. The activities being carried out under this step by the Disaster Management Authority can be divided into two main categories –

Structural Remedies for Disaster Mitigation

- With the help of the Public Works Department, make sure all public buildings such as schools, hospitals, health centres etc. are safe from danger and earthquake-resistant techniques have been used in building construction and they have sufficient exit doors and fire extinguishers at proper places.

Coordinate with the Public Works Department to ensure the construction of houses are multi-hazards resistant and suited to the local culture of housing construction.

- Examining the construction work of any kind happening in the district as per the building by laws through the DDMA and ensure the compliance of those standards by giving appropriate instructions to the concerned officer.
- Identify and analyse potential risks arising from the development work of any department.
- Support in developing disaster resilient designs in consultation with technical agencies so that the Public Works Department can use them.

Non-Structural Remedies for Disaster Mitigation

- Develop, maintain, review and disseminate accurate information in the public for early warnings.
- Identification of staging area and formation of IRS team.
- Review the response initiatives of any department to disaster or the situation of an immediate disaster and to give necessary instructions for its upgradation.
- Ensure that the communication system remains intact and disaster management practices are rehearsed from time to time.
- Establishing network by making contact with neighboring district officials and appropriate national and international agencies.
- Define rules and regulations, particularly during the disaster, for the operation of the work of the DDMA.
- In the absence of the Chairman/Coordinator, define the protocol to call a meeting of the DDMA.
- Support to protect the important files and information of the DDMA and ensure that they are backed up as soon as possible.
- Developing mechanisms for quick information sharing between core agencies like Police, State Disaster Response Force, Army, Paramilitary Force, NDRF, ITBP, SSB etc.
- Interact with the core agencies of State Emergency Operation Centre, Police, State Disaster Response Force, Army, Paramilitary Force, NDRF, ITBP, SSB etc. at specific intervals, especially before the monsoon.
- Identifying potential threats/ hazards and take immediate steps/ actions. Review all the measures taken for preparedness and the ensure appropriate response to the disaster or possible disaster as per the guidelines/indicators related to the respective departments and local authorities..
- Identifying the building/site to be used as a relief centre/camp during a disaster or a future disaster, and arranging other essential items as needed.

- Establishment of reserves of relief and rescue material and ensuring that the preparations for providing relief material in a short span of time are complete.
- Coordination with the Disaster Management Department or other major agencies for any specific preparedness guidance, supply, training etc.
- Directing the Emergency Operation Centre to get regular information of warning from various sources.
- Develop mechanism through the Emergency Operation Centre for quick dissemination of early warning information.
- Examine the necessary equipment and availability of materials at the appropriate places in the districts, assessing the need for additional purchasing or material supply for sensitive areas and for this, order the concerned officers to take necessary action.
- Identify the multi-purpose community shelter in all the vulnerable areas.
- Review the contingency plan and preparedness of the District Emergency Operation Centre, Police and the Immediate Response Team.

Need Assessment and Capacity Building

The capacity building of key stakeholders like departmental staff and community on prevention, mitigation and preparedness is an important element. With changing nature of disasters, it is necessary to conduct training/orientation on certain subjects for capacity building at each level. It is also a great responsibility of the department to conduct awareness drives at the community level. Under the need assessment and capacity building, the following activities are recommended –

- Develop groups of architects, engineers and masons and to train them for building safe infrastructure
- Encourage resilient building construction techniques and develop policies and rules to mainstream in development plan. and to include them in the
- Implement insurance policies and other beneficial schemes that can be compensated for any damage caused by a hazard, encourage insurance schemes for crop, livestock, small business etc. to reduce economic losses.
- Running a continuous awareness and incentive programme to pursue a new design in the community to create disaster-resistant housing and to provide as much encouragement and support as possible for it.
- Ensure capacity building on first aid and search and rescue process to children (from primary to collage) –.
- Analyse training needs and ensure training from time to time for volunteers, police department, home guards, youth and women organizations and employees associated with line departments through the DDMA.

- Providing facilities for planning, resource mobilization and training for identified training needs.
- Developing calendars for mock drills and awareness building work according to favourable weather and the needs of the stakeholders.
- Ensure special training programmes for different levels of officers, employees and voluntary rescue workers and to establish coordination among them.
- Increasing the facility of training programme in the community to reduced disaster impactswith the help of local bodies and government and non-governmental organizations.
- Support DDMA to conducts awareness campaign and training for the vulnerable community about the future risk so that they are enable to deal with the damage caused by disasters.

Nodal Agency for Early Warning

The early warning system plays an important role in reducing the risks of any type of disaster. The department or organization which has a more active early warning system from the state to the district level, the lesser the risk to that department or organization in the context of the disaster. The early warning system should work in both directions, from top to bottom and from bottom to top. That is, prior warnings or information received from the government level are important for preparing the community for disaster relief and it is also necessary for the administration to take information from the community in order to plan locally.

Institutions authorized by the Government of India to give initial warning during the various disasters in respect of disasters at the department level are as follows:

Table 2: Institutions authorized by the Government of India to issue early warning for different disasters

Disaster	Authorized Institution
Flood	Central Water Commission
Heavy Rain/ Cloud Burst, Landslide	Geological Survey of India
Avalanche	Snow/Ice and Avalanche Study Establishment
Loo and Cold Wave	Indian Meteorological Department

The Government of India classifies the warning of danger according to the level of intensity of disasters. Details of various disasters and related warnings are as follows –

Heavy Rain/Flood/Flash Flood

A network of flood warning stations and daily water bulletins have been developed in the following sections to provide flood related information and daily water bulletins to all designated office bearers and agencies of the Central Government,

State Governments and District Administrations by the Central Water Commission for all major river valleys during the southeast monsoon season –

Table 3: Categorization of danger in terms of flood disaster

Category	Description
Fourth	Low flood (water level between warning level and danger mark)
Third	Moderate flood (water level below 0.50 meters, less than high flood level and above danger mark)
Second	High flood (water level below high flood level but at 0.50 meters of high flood level)
First	Extraordinary flood (water levels at high flood level or above)

Landslide

Indian Geological Survey Division issues pre-warnings related to landslide to all authorized officials and institutions of the Central and State Government and the District Administration in the following categories –

Table 4: Categorization of danger in terms of landslide disaster

Category	Description
Fourth	Landslide of small intensity, whose impact site is far from human settlement and there is no loss of life and property.
Third	Landslides under this class are of relatively high intensity and this leads to loss of structural facilities like important highways and roads, railways and other civil facilities, electricity, water etc.
Second	The impact of landslides in this class is on people living near the settlement areas, resulting in loss of lives and property, but in small quantities.
First	Under this category are those landslides which are near populated areas like urban areas or denser populations. By doing any activity on such slides, human life and property are likely to suffer widespread losses.

Avalanche

In the context of warning of avalanches, Defense Research and Development Organization, Chandigarh is responsible for issuing warnings to all the designated officers and agencies of the Central and State Governments and the District Administration. Avalanche related categorization is as follows –

Table 5: Categorization of danger in terms of avalanche disaster

Category	Description	Stage
Low	Generally, it is a favourable situation. In this situation, triggering is required in areas with heavy loads and extreme slopes. At such a time, lives/people are safe in the valley. Caution is required while walking on slopes.	Yellow

Moderate	This is partly an adverse situation. Most avalanche impact slopes and places with additional weight are more prone to its outbreak. It can also occur in the valley. In this situation, one should go on the slopes with extreme caution. One should be vigilant while roaming in the valleys and avoid variance on steep slopes. Caution should be taken in the selection of travel routes.	Yellow
High	This is an adverse situation. Its danger is prevalent in all the areas prone to avalanches. There is also a higher chance of its outbreak in the valley regions. In such a situation, all types of activities should be stopped. At this time, there is also the possibility of air borne avalanche.	Orange
All four sides	This is a very adverse situation. There is a possibility of a major avalanche on all possible avalanche slopes. At such a time, all types of activities should be stopped. At this time, there is also the possibility of air borne avalanche.	Red

Earthquake

Forecasting an earthquake disaster is not possible. Still, it is possible to find out about earthquake and tremors and monitor them. Indian Meteorological Department is the nodal agency of the Government of India, which monitors seismic activities in the entire country and in nearby regions. The Indian Meteorological Department is responsible for assessing the parameters of earthquake sources immediately after the earthquake and provides information to all the concerned agencies of the Centre and State responsible for relocation and rehabilitation. It is also the responsibility of the Indian Meteorological Department to give earthquake information to the public information channels, press, media and post it on its website.

Table 6: Categorization of danger in terms of earthquake disaster

Category	Description	Stage
Low intensity	More than 5.0 on the Richter scale	Yellow
Moderate intensity	More than 5.0 on the Richter scale but less than 7.0	Orange
High intensity	More than 7.0 on the Richter scale	Red

3.2 RESPONSE ACTION

Disaster Management Authority have key role during any disaster. They play an important coordination role with the line department in executing response activities. For effective response, formation of the disaster cell, the disaster management team and the appointment of the nodal officer is done in accordance with the guidelines of the Incident Response System (IRS). IRS team works in response in association with line department Based on the early warning information received from the authorized agencies response activities are executed.

Triggering Mechanism

Under the triggering mechanism, all the line departments and emergency operation centres are activated for themselves to respond immediately after getting any warning or any kind of information. Activities that have been identified under the Response Plan are those which are self-motivated activities to minimise the effect of the disaster and reducing the losses. The main purpose of a triggering mechanism for natural disasters is to work in a controlled way in order to control its intensity and manage the situation in case of disaster. Triggering mechanisms may vary according to different situations i.e. where the pre-warning system is available, the triggering mechanism will be different while the areas where the pre-warning system does not work, different triggering mechanisms will be discussed.

A. In case of availability of pre/early warning system

- Nodal agencies at the national level are authorized to collect information about incidents of natural disasters and to spread future possibilities about disaster. These nodal agencies will give prior notice of the potential danger based on the prediction of the disaster under the prescribed protocol for the National Emergency Operation Centre and the Home Ministry.
- Based on the forecasts received from the nodal agencies, the National Emergency Operation Centre and the Home Ministry will monitor the circumstances and issue warnings to the state and district level emergency operation centres and other authorized officials to be vigilant.
- Based on the severity of the situation, the National

In the short term, certain specific measures can be adopted in respect to certain specific disasters to spread the warning or information related to the disaster and its threat to more people. As in the situation of fire, alarm can be played, playing the siren in the event of a disaster caused by industries, in the case of floods and landslides, people can be alerted and warned by broadcasting through channels such as radio, television, loudspeaker and waving a warning flag.

Emergency Operation Centre will be informed by the State Emergency Operation Centre and the District Emergency Operation Centre and other authorized officials to fully activate the emergency operation centre established at the state and district level.

- State and district level emergency operation centres, from the state to the development block, will give directions to the local administration to prepare with their available human and other resources to respond to the situation of the disaster.
- Disseminating warnings to potential communities affected by disaster and their safe evacuation from the potential area will be the first and foremost task.
- A dialogue mechanism should be established at the district level, so that real information can reach the people in their proper form.
- Once the warning is issued, the community must be constantly warned with the latest information update about the disaster.
- When issuing warning, special attention should be given on the words used for warning. It should always be kept in mind that the language of warning should be simple and easily understood by a common man.
- In view of the possibility of disaster, the District Disaster Management Authority/District/Local Administration will do the work to evacuate the people from the disaster site. For this, a comprehensive order will be issued at the state and district level and all necessary preparations will be ensured.
- All the concerned officials on duty at all levels will do be follow-up so that they are ready to respond to the disaster situation.
- Standing orders related to disaster and preparedness will be reviewed on an annual basis and the reviewed standing order will be broadcast among all concerned. Prior to the arrival of the monsoon every year, the work of evacuation from the disaster prone site will be done with community participation at the tehsil and district level.

B. In case of non-availability of pre/early warning system

In case where no early warning system related to natural disaster is received/ working, recuse and relief work should be executed immediately. The following procedures are adopted in such situations –

- The District Emergency Operation Centre, District Magistrate, Deputy District Magistrate will be informed about the incident by the people working at the field level and the nodal departments.
- The District Emergency Operation Centre will be fully operational to deal with the incident.
- The State District Disaster Management Authority/State Emergency Operation Centre will be informed of the incident by the District Emergency Operation Centre/District Magistrate and seek help from them.

- The State Emergency Operation Centre will be active and will inform the National Emergency Operation Centre. The National Emergency Operation Centre will receive the first information from here.
- Quick response teams, search and rescue teams and health and paramedical teams will be formed soon after getting the information.
- The District Magistrate themselves will review the situation and take coordination, order and control in their hands.
- Incident Response Team will be formed.
- A meeting of all concerned will be called by the District Disaster Management Authority to review the situation.
- A team will be constituted for a quick assessment of the loss due to the disaster.
- The concerned departments/agencies will get active to start the work related to electricity, communication, transportation etc.
- With the view to provide immediate relief to the disaster-affected people, arrangements for supply of food items, drinking water etc. will be ensured.
- After this, follow-up activity will be done by each concerned department at every level to monitor the Response and Relief work.

Incident Response System (IRS)

To handle any disaster situation, the system of managing tasks in a standardized manner is called the Incident Response System (IRS). Under IRS, there is an Incident Commander, under whom there are efficient officers for the various aspects of emergency management like logistics, work operations, planning, security, media management etc. All these together constitute the Incident Management Team, which manages the disaster.

Although there is a strong administrative system from national level to the village level in India and coordination among officials of each level for disaster management, but there is a need to include the principle of IRS in this system to make it even better and to provide strength. The NDMA has issued guidelines on the IRS and these guidelines are also available on the website of the NDMA (www.ndma.gov.in). The State Disaster Management Authority should refer to this IRS to establish administrative system during disaster situations.

According to the policies of the Government of India on disaster management, the IRS is being integrated into the existing administrative system and in every district, the district level officers will be trained on the various aspects of emergency management and they will constitute an IRS team. With the involvement of the Joint Operating Room at all levels, the use of techniques and contemporary systems in planning and implementation will be emphasized.[11]

[11] SOP of Govt. of H.P.

Response Institutions – Role of Police, Military, ITBP, SSB/NDRF/SDRF/Fire Brigade/Home Guards/Civilian Core etc.

Police, Military, ITBP, SSB

In terms of disaster, police, military, ITBP and SSB play an important role. The role of the police is to be the first responder during the disaster i.e. in the case of any natural or human disaster, the first department to reach the disaster site is the police department. During the disaster period, the police collaborate with organizations/agencies engaged in rescue and relief work, while maintain law and order in the district.

Preparedness

- Identifying the highly vulnerable areas prone to disasters prepare the police force for emergency search and relief operations.
- For the search and rescue work, constitute special disaster response forces/battalions under the state police force and deploy such forces in appropriate places.
- Appointment of a nodal officer to coordinate with the emergency headquarters of the police headquarters and the emergency control room at the district headquarters and the emergency management of the Disaster Management Department.
- Issuance of instructions for implementation of Disaster Management Emergency Plan of all the districts and other units.
- Essential steps to identify and protect important structures of the Police Department in the potential/affected areas.
- Preparation to identify vehicles for transportation and to send them to affected areas in a short time.
- To deal with any emergency, contact the District Collector, Development Block Officer and provide all possible assistance to the local administration and disaster management committee at each level.
- Provide wireless access to the police for disseminating disaster related information/communication upon request from the competent authority.

Proceedings During the Disaster

- Participation in the search and rescue operation with the help of local administration.
- Arranging additional police forces in the affected areas to maintain rule of law and to protect the affected population.
- Take special note of criminal and anti-social elements and activities in the affected areas and take appropriate steps against them as required.
- Arrangement for the safety of relief camps, relief materials and affected population.
- Helping local administration in campaign against profiteers, black marketers etc.
- Security of government properties and structures damaged by disaster.

- Management of emergency traffic arrangements around damaged roads etc.
- Assist the local administration in protecting the surrounded/trapped and disposal of corpses.
- Control of the crowd and law system at the time of distribution of relief material at relief camps and other places.
- Prior recognition of stampede-prone areas, places and events and necessary police deployment.
- Ensure the assistance of SDRF/Fire Fighting for rescue of populations from affected areas during floods and landslide.

NDRF/SDRF

During disaster, at the Centre and the State level, NDRF and SDRF is a strong action team which is working under the direction of the central and the state government and in case of emergency, it also helps in other states during disaster with the state government's permission.

Key Activities performed during the Disaster

- Response work with special efficiency for rescue and relief in any kind of natural or man-made disaster situation.
- Ensure the deployment of staff for a long period of persistency of the disaster.
- To make the disaster prone area or people pollution free and to ensure cleaning of debris and disposal of dead bodies.
- Identifying the dead bodies as per pre-settlement, getting their post mortem done and protecting DNA in the event of non-identification.
- Bring the disaster affected/victims to a safe place and provide first aid immediately to the injured.
- Helping the local administration in providing relief during or after the disaster.
- Coordination with other departments engaged in rescue and relief operations.

Fire Brigade

- Ensure establishment of control room at headquarter, tehsil and district level.
- Upon receipt of early warning of the occurrence of the disaster, immediately contact the local administration of the district and development block level by the fire brigade units and start the work as per their direction. All employees will be immediately gathered at the nearest fire brigade unit and sent to the affected areas promptly, wherein while coordinating with the local administration, they will work to remove water through pump from fire, first aid, search, evacuation, transportation of the injured, food grains and other important structures.
- Ensure the removal of people trapped in collapsed or damaged buildings, damaged vehicles, aircrafts, industries, boilers, mines etc.
- Take control of the dangerous situation due to petroleum, gas and other hazardous materials.

- Ensure measures to protect against fire accidents in property and environment.
- Ensure arrangements for calling personnel as required from other less affected areas.
- In the event of flood, landslide, cooperation from voluntary organizations and non-governmental organizations.

Activities Performed by the Authority during the Disaster

The following key activities are carried out by the USDMA during the response

- Coordinating with the local authorities and issuing necessary directions to ensure the immediate and effective work of prevention or reducing its effect in the state of disaster or near disaster situation.
- To ensure the arrangement of alternative mechanisms for the exchange of information, especially during the disaster situation in case of unavailability of mobile network.
- Issue of instructions for collecting all teams in the staging area.
- Ensure sending all teams to the disaster site with full equipment.
- Establish coordination among all the teams.
- Operate the centre established in the office.
- During the disaster, keep in touch with the Disaster Control Room regularly and keep them informed of the situation.
- Take the decision at the state level to arrange emergency budget.
- Coordination with the NDMA and the Home Ministry during the disaster.
- Maintain regular contact with various technical institutions like – ISRO, IMD, GIS, Remote Sensing and institutes situated in Chandigarh.

3.3 POST DISASTER ACTION

The key activities performed by the department in this stage are as follows –

- Analyzing the relief and rescue operations done in previous calamities, identify and document the success and failure stories
- updating the State and District Disaster Management Action Plan annually incorporating lesion learned during the year.
- Assessing the damages in the disaster prone areas, the Authority forward the financial proposal for the allocation of the budget at the national level.
- Get the concerned departments to assess the structural and non-structural infrastructure that is affected by the disaster for its reconstruction.
- Immediately execute the relief work among the affected communities in disaster-affected areas.
- Establish coordination at the district and state level for the rehabilitation/resettlement of the affected community/area/group during the disaster.
- After the disaster, continuance assurance of basic services like accommodation, food, education for children, health/medical services for the elderly etc. in the running relief camps.
- Ensure identification of missing humans as per human losses caused during the disaster and to coordinate with concerned departments for conducting the DNA test of the remains.
- Provide funds from the SDRF, State Disaster Management Fund and other funds to provide relief to people' affected during the calamity/ disaster.

4. MONITORING, REVIEW AND KNOWLEDGE MANAGEMENT OF DEPARTMENTAL DISASTER MANAGEMENT PLAN

4.1 MONITORING AND REVIEW

It is an important aspect to check the effectiveness and shortcomings in the process of implementation of Departmental Disaster Management Plan. Using this document as an effective implementation tool during the disaster, determining indices, periodically reviewing the measures to overcome loopholes/ gaps and by updating the plan from time to time, it will also be used as a monitoring tool for disaster management efforts.

On the other hand, the learning process during the process of documenting the disaster management plan and its implementation will also help the department to assess its responsibility during the time of the disaster. At the departmental level, not only can the work done during the various stages be reviewed, but at the level of the State Disaster Management Authority, it will be seen whether the planned activities are going in the right direction or not.

In order to check the level of preparedness and upgrade departmental coordination during emergency, mock drill may be a better method of rehearsal testing. It to be based on past experience of disaster and learning received. On one side of the mock drill, it is important to evaluate the response activities, while on the other hand, it will also help in better coordination with administration, various departments, voluntary organizations, other stakeholders and communities. The mock drill will not only help in understanding the aspects that are missing from the plan, rather it will help the department in updating the plan. Due to continuous mock drills, the ability to respond is faster and better and the task of response and re-evaluation will also be done.

The Authority should certainly perform the following tasks –

- Developing performance index involving time limit and expected results. This index should be both quantitative and qualitative.
- Implementation of mitigation and prevention plan.
- Quarterly review of the programmes being run at the state and district levels.
- Reviewing the preparedness and response system.
- Preparation of index of preparedness and response results.
- After the disaster, review and feedback on state and district level.
- Training of officers/employees on disaster management through the DDMA.

The assessment and evaluation of the Departmental Disaster Management Plan will be determined on the basis of the following points –

- Availability of resources
- Coordination between different departments/agencies
- Participation of the community
- Participation of voluntary organizations
- Participation of insurance companies

4.2 ROLES AND RESPONSIBILITY OF THE UTTARAKHAND STATE DISASTER MANAGEMENT AUTHORITY AND THE STATE EMERGENCY OPERATION CENTRE IN MONITORING AND EVALUATION

Local Level Implementation of Departmental Disaster Management Plan

- Identifying and ensuring the implementation of disaster risk reduction in all development projects and schemes.
- Examine the resources available in the districts every six months and check whether they are adequate and active.
- On the basis of analysis, the department has to issue guidelines for the use of development funds for the removal of unused and scraped resources and the purchase of new resources in their place.
- Monitoring that all activities related to prevention, mitigation, preparedness and response are being implemented correctly within the district.
- Identifying the centres and activities funded by the Central or State government that can be used for disaster management. In the meantime, the standards of the centrally sponsored schemes should also be kept in mind.

Audit of the Implementation

The monitoring and evaluation work can be done by various audits of the department. Some of those are as follows –

- Electricity audit of important infrastructure, including urban areas.
- Fire safety audit of all important infrastructure of the department, including urban areas.
- Emphasize the use of National Building Code during the construction of departmental buildings, hospitals etc.

Documentation of Learning

Updating the Plan

The Departmental Disaster Management Plan prepared by the Disaster Management Authority is a "living document" and this to be updated each years, before the month of May. The updated version must be uploaded on the website of the authority. The following points will be considered while updating this document –

- Identifying and listing of / existing and new vulnerable areas.
- Identifying and listing of necessary resources.
- Updating human resources.
- Identifying technical necessities, equipment/machines and update them accordingly.
- Understanding the issue of inter-departmental coordination and coordination with other departments and working towards improving it.
- Linking disaster management activities with other plans/programmes.

Reporting and Documentation

Every year before March, annual report/documentation should be done about the implementation of the Departmental Disaster Management Plan, in which the process of preparing the disaster management plan, adopted strategy, main achievements, challenges, coordination, desired help from the State Disaster Management Authority/District Disaster Management Authority are to be included. A few case studies related to disaster management plan should also be included in the report.

Post Disaster Evaluation

The USDMA will evaluate its performance based on monitoring indicators. The Authority should carry out the following evaluation tasks –

- Nature of interventions and cooperation by the state
- Suitability of institutional structure, nodal officers and other authorized officials
- Time and resources incurred for the response activities
- Coordination with line departments
- Institutional arrangement and its work
- Need and necessary correction of operational procedures
- Effectiveness of monitoring
- Communication and logistic related issues

5. BUDGET AND FINANCIAL ASSESSMENT

5.1 STATE DISASTER RESPONSE FUND (SDRF)

In accordance with the provisions of the Disaster Management Act 2005 and on the recommendations of the 13th Finance Commission, the State Disaster Response Fund was formed in place of the Calamity Relief Fund (CRF). In this Fund, 75 per cent contribution is from the Central Government and 25 per cent contribution is from the State Government. The Central Government gives its contribution in two stages/phases every financial year in the months of June and December. Similarly, the State Government also gives its 25 per cent contribution to the SDRF in two stages/phases in every financial year in the months of June and December. In case of a certain disaster, if the Home Ministry takes cognizance of it, then on the request of the State Government, the Central Government can give 25 per cent of its contribution of the incoming year in advance, which will be adjusted in the contribution of the coming year. According to the guidelines of the Constitution and the State Disaster Response Fund administered by the Home Ministry under the Government of India, the State Disaster Response Fund will be used to provide immediate relief to the people affected by landslide, earthquake, flood, fire, avalanche, cloud burst and attack of insects. The Principal Secretary of the State will decide on the issues related to all the immediate expenses related to the relief of the State Disaster Response Fund.

5.2 NATIONAL DISASTER RESPONSE FUND (NDRF)

In accordance with the provisions of the Disaster Management Act 2005 and on the recommendations of the 13th Finance Commission, the National Disaster Response Fund was formed in place of the Calamity Relief Fund (CRF) at the Government of India level. The administrative arrangement of the National Disaster Response Fund is in the hands of the National Executive Committee. In the event of severe disaster, when relief work cannot be met by the State Disaster Response Fund, after providing some necessary procedures at that time, additional assistance is provided by the Central Government through the National Disaster Response Fund. For this, it is necessary for the State Government to submit a memorandum mentioning extent of damages/ losses and necessary funds. After getting the state's memorandum, an inter-union central team is formed and they are given the responsibility to assess the physical funding of the damage and to assess the necessary funds for the relief work according to the existing materials and standards. After the deliberations by the Home Secretary on the report submitted by the inter-ministerial team/National Executive Committee, the Central Team Report by the High Level Committee comprising Finance Minister, Agriculture Minister, Home Minister and the Deputy Chairman of the Planning Commission and on the basis of recommendation of the inter-ministerial team, the request of the state government is considered and funds are recommended from the National Disaster Response Fund keeping in view the current contents and

standards. In case of disaster, the Centre, immediately under the State Disaster Response Fund, provides the remaining part of its 75 per cent contribution. The expenditure from the State Disaster Response Fund/National Disaster Response Fund is done by the State Government. With the help of the Ministry of Finance, the expenses incurred by the State Disaster Response Fund and the National Disaster Response Fund as determined by the Ministry of Home Affairs of the Government of India are spent only on the basis of the necessary items for relief in the standard and catastrophic disasters.

5.3 CHIEF MINISTER RELIEF FUND

At the state level, the Chief Minister Relief Fund has been set up for the purpose of providing immediate assistance to people affected by natural disasters or to people affected in road, air or rail accidents.

5.4 ISSUING FUNDS TO DEPARTMENTS AND DISTRICTS

Due to natural calamities, contingency assistance for affected persons/families, to set up relief camps, to run *Langars*, to set up camps for animals, to provide compensation amount to the families of the dead, to provide compensation in case of damaged house, to provide support to displaced families and animals, to assist in the reconstruction of homes falling/destroyed from natural disasters etc., the required fund is provided through the District Magistrate. In case of damage to public property, funds are issued to the concerned department for their immediate repair and maintenance. After receiving request from the District Magistrate/concerned department, funds are allocated after receiving the recommendation from the State Executive Committee. However, for the relief work, funds are issued by the special Relief Commissioner/Chief Secretary and in the next meeting of the State Executive Committee, it is presented for recommendation. In order to avoid delay in the relief work in the state of disaster, the District Magistrates have been instructed to make available the grace amount from the available funds in the district and register it after receiving relief from a special Relief Commissioner.

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