विभागीय आपदा प्रबन्धन योजना

सिंचाई विभाग,
उत्तराखण्ड

देहरादून, उत्तराखण्ड

देहरादून, उत्तराखण्ड

गोरखपुर एनवायरन्मेन्टल एक्शन ग्रुप,
गोरखपुर

Index

List of Maps and Tables

Maps

Tables

Vocabulary

CAP	:	Contingency Action Plan
CMG	:	Crisis Management Group
CRF	:	Calamity Relief Fund
DDMA	:	District Disaster Management Authority
DEOC	:	District Emergency Operation Centre
DMMC	:	Disaster Mitigation and Management Centre
ERS	:	Emergency Response System
ERT	:	Emergency Response Team
IDRN	:	Indian Disaster Resource Network
IPCC	:	Intergovernmental Panel on Climate Change
IRS	:	Incident Response System
NDRF	:	National Disaster Response Fund
RO	:	Regional Officer
SDRF	:	State Disaster Response Force
SDRF	:	State Disaster Response Fund
SMS	:	Short Message Services
SOP	:	Standard Operating Procedure
USDM	:	Uttarakhand State Disaster Management Authority

PREFACE

The geophysical conditions, variation in climatic components and recent occurrence of disasters have made clear that that the state Uttrakhand is a multi- hazard prone state of the country. On one hand, the state is a very attractive tourist destination as almost 86 per cent of its area is hilly and 65 per cent is forested and tourism is a major business here. On the other hand, the state's vulnerability is also increasing due to natural calamities like flash floods, landslides and earthquakes. Considering the vulnerabilities of the state and recent occurrences of different disasters, the state has become sensitive and taken several measures and initiatives to enhance capacity of the disaster management system. In this process, and, empowering the operational centres, district administration and other institutions, capacity building of the state and district departments' community and other stakeholders is being done. In order to increase activism in the disaster management work of the state's main departments related to various disasters, it is necessary that they have a clear understanding of their role and responsibilities at the time of disaster and the systematic arrangement of work and coordination of other departments. The State Disaster Management Authority (SDMA) has prepared the Departmental Disaster Management Plan of the Irrigation Department with departmental cooperation in compliance with Article 40 of the Disaster Management Act, 2005.

To prepare this departmental disaster management plan, various guidelines, regulations and schemes issued at the central and state level such as – Disaster Management Act 2005, the SOPs and guidelines issued by the National Disaster Management Authority, SOPs prepared for various disasters by different states of the country, Departmental Disaster Management Plan and IRS guidelines – were consulted. Apart from this, various information related to the department was collected by meeting the department and district level officials. This departmental disaster management plan will help the department to work effectively in disaster situations.

OBJECTIVE

The following are the objectives for preparing a departmental disaster management plan for the Irrigation Department –

- Ensure the integration to disaster risk reduction measures in the routine developmental works and services provided by the Irrigation department.
- Ensure rapid and effective response in case of any disasters
- Ensure the protection of the physical resources of the Department.
- Quick reset in case the departmental resources affected by disaster.

PLANNING STRATEGY

In order to prepare the Departmental Disaster Management Plan of the Irrigation Department, the state's hilly and plain situation and changes in the nature of disasters according to the same and the potential damage and its effects are kept in mind. The strategies adopted for preparing the plan can be seen under the following points :

- In order to come to a common understanding of standard operating procedures and departmental disaster management plan, an initial meeting was held with the officials of the concerned departments.
- To prepare the departmental disaster management plan and the standard operating procedures, various guidelines, regulations and schemes such as – Disaster Management Act 2005, the SOP and guidelines issued by the National Disaster Management Authority, SOPs prepared for various disasters by different states of the country, Departmental Disaster Management Plan and IRS guidelines – were examined.
- The present working system and the disasters in districts were discussed in the meetings with the state level office of the Irrigation Department.
- In view of preparing the Disaster Management Plan, the pattern of the disasters, the structure of the department and the work at the district level were kept in mind while selecting the sample Districts.
- Sample districts were visited/toured and meetings were held with the officials and the community. Attempts were made to understand the timing of departmental activities before, during and after the disaster, officials/workers responsible for those activities and the time of editing the activities. In addition to this, the role of the Department before, during and after the disaster, the physical resources available in the department, abilities and weaknesses were also discussed.
- Work was also undertaken to collect data on damage caused by disasters, human resources, plans and distributions etc.
- The first draft of the Disaster Management Action Plan was prepared and shared with the department and it was updated on the basis of suggestions received from the Department.
- In a joint meeting of the Irrigation Department and the State Disaster Management Authority, this disaster management plan was reviewed and based on the suggestions receives, it was rewritten and the last draft of the disaster management plan was submitted to the Disaster Management Committee for the recommendation.
- The Department submitted the sanctioned disaster management plan to the State Disaster Management Authority.

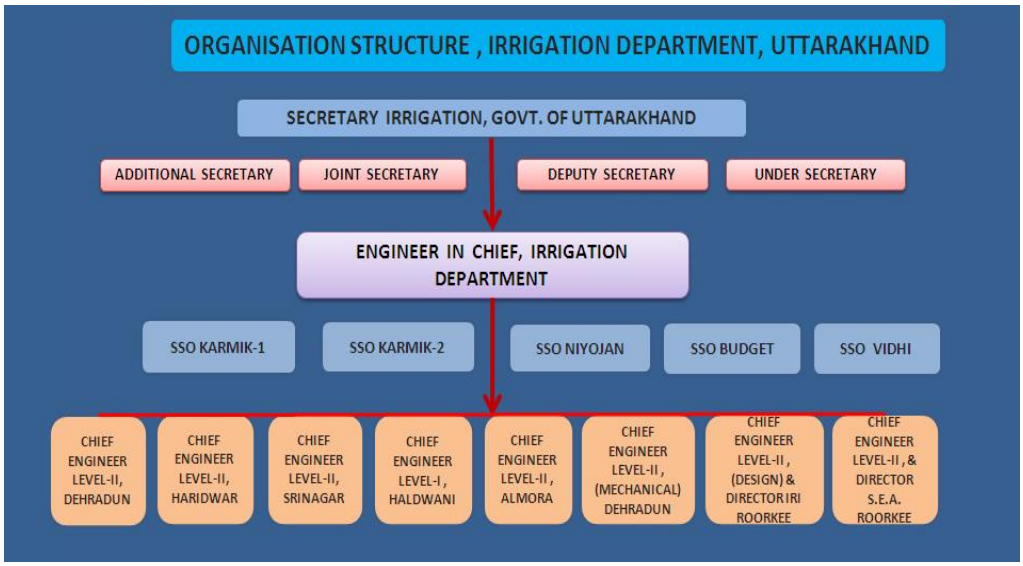
1. INTRODUCTION

1.1 Brief Introduction and Work of the Department

About the Department

Uttarakhand Irrigation Department is responsible for improving the irrigation facilities in the state and adopting flood control measures. For the development and advancement of the irrigation system, the department is ensured with the construction and maintenance of canals, dams, reservoirs and barrages. For flood control, the department also undertakes the construction and maintenance of flood protection works and also monitors the water level in the rainy season every day. After the formation of the state, till March 2016, 787 canals in total length of 6356 km, 836 tube wells, were constructed by the department, which created 1.41 lakh hectare irrigation capacity. A total of 473 flood schemes were also created in this order. Security was especially provided by the flood schemes in villages/places damaged by the flood of 2010, 2012 and 2013. Various model tests and testing work is done in the Research Institute in Roorkee under the Department. The work of other departments is also done by the Irrigation Department in the deposit item. It is worth mentioning that the foundation of independent India's first water source and hydropower project "Yamuna Valley Hydroelectric Project Stage – 1" was laid in Dhakpathar, 46 km away from Dehradun, which was then in Uttar Pradesh. The information related to the location /establishment of the Barrages is given in annexure no 1. Although, the construction of these dams/barrages/projects has been done under various purposes and they are owned by other government and private departments/agencies such as – UJVNL, NHPC, THDC, Him Urja Pvt. Ltd., Chamoli Hydro Pvt. Ltd. etc. – however, due to the construction of all these dams/barrages/projects on some river, they must be mentioned in the duties of the Irrigation Department.

Organizational Structure of the Department



2. Hazard, Risk, Vulnerability and Capacity Assessment (HRVCA)

2.1 The Nature, Intensity and Density of Disaster at the State Level

Uttarakhand: An Introduction

Uttarakhand is a hilly state in the Indian Himalayan region. Earlier, Uttarakhand was a part of Uttar Pradesh. On 9 November 2000, 13 hilly states of Uttar Pradesh were constituted together to form Uttarakhand 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 $km^2$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. It is a different story that most of the country's reputed English medium schools are established in this state.

Map 1 : State Map with District boundaries

Uttarakhand falls in the category of most sensitive states in terms of 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), 2013 (A.R.4), 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 aquatic-weather disasters. But in the case of intensity and frequency of aquatic disasters, the mid-19th century period was very bad. The years 1970, 1986, 1991, 2001, 2002, 2004, 2005, 2008, 2009, 2010, 2012 and 2013 for notable in terms of natural calamities for the state of Uttarakhand. 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.

Hydro met Disasters

The following disasters mainly fall under hydro met disasters –

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

Geological Disasters

In addition to the aquatic-weather disasters, there are some disasters that are the result of movements inside the Earth, such as :

- Landslide
- Earthquake
- Dam breaking/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

Some Major Disasters

Some of the main natural calamities in the state and details related to them are given below :

- There were two fierce incidents of landslide in Sher-Ka-Daanga in Nainital in 1867 and 1880. In 1880, the landslide happened due to heavy rain and tremors of earthquake. A large number of houses were destroyed during this landslide. A portion of Naini Lake was permanently wrecked with debris.
- Due to floods in the Alaknanda river in 1893, landslide occurred near Birehi Ganga river and the confluence of Alaknanda river, due to which there was a huge blockage of 10-13 meters in the river. One guarder bridge breached and another got damaged.
- Flash floods came along with landslide in the Rishi Ganga river in 1968. Due to landslide in Reni village, there was a blockage in Rishi Ganga river in Garhwal.
- Patel Ganga, a branch of the Alaknanda river, suffered landslides in the year 1970, due to which the river Patel Ganga was blocked and it turned into a lake-like water source. Due to the sudden disruption of this lagoon water

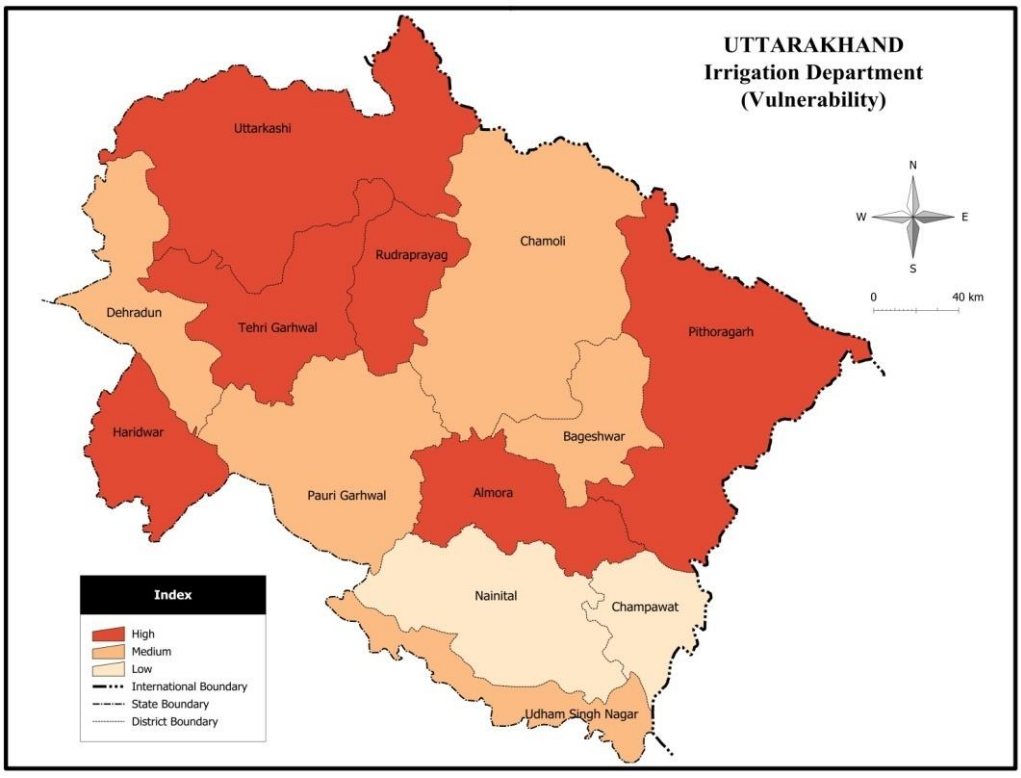
source, sudden floods in the Alaknanda river caused floods and consequently, they were faced with many landslide incidents.

- During 1971, there was a severe landslide on the banks of the Kanauldiya Gaad, a branch of river Bhagirathi in the upper reaches of Uttarkashi. The debris from the landslides created a cone's shape, causing the water surface to be up to 30 meters high and the water stream split causing the rapid flooding in the areas below.
- During the period of June 2013, incidents of cloudburst continued for several days, resulting in massive floods and landslides. Due to the disaster caused by this multi-day cloudburst, there was a huge loss of lives and money. After the tsunami in 2004, this disaster was counted as one of the biggest disasters.

2.2 Historical Analysis of the Risks of Departmental Resources

Vulnerability of the Irrigation Department

Irrigation Department is an important department in the state and is vulnerable in terms of increasing Floods, landslides, cloudburst events. Due to being



responsible for the activities related to water management, the department's sensitivity was analyzed in a broader context. Based on the following map of analysis, it can be said that the districts of Uttarkashi, Rudraprayag, Pithoragarh, Tehri Garhwal, Haridwar and Almora fall into the most sensitive cadre. The potential loss due to disasters in Dehradun, Chamoli, Paudi Garhwal, Bageshwar and Udhamsingh Nagar is relatively less in the above districts. While Nainital and Champawat fall under the least sensitive area.

Based on the data available from the department, the details of flood control wall are given in the following table.

Table : 1 Vulnerable flood control walls under the Irrigation department

Sl. No.	Division	Vulnerable Flood Protection walls	
		Numbers	Length (in KM)
1	Rudrapur	15	10.595
2	Sitarganj	03	11.300
3	Narendra Nagar	04	1.860
4	Tehri	02	2.590
5	Dugadda	05	7.690
6	New Tehri	02	2.590

Apart from the above mentioned sensitive flood control walls there are many other sensitive areas where flood control wall is necessary. These are mentioned in the following table

The detail information about the above table is given in the annexure 2

Sl. No.	Division	Vulnerable Flood Protection walls		Vulnerable/ Most Vulnerable
		Numbers	Length (in KM)	
1	Shrinagar	03	2.405	Vulnerable
2	Rudraprayag	11	6.260	Vulnerable
3	Kedarnath	06	1.850	Vulnerable
4	Chamoli	06	1.800	Most Vulnerable
5	Chamoli	07	1.991	Vulnerable
6	New Tehri	02	2.590	Vulnerable

Note : *Details are given in Annexure 2.*

2.3 Climate and Climate Generated Challenges

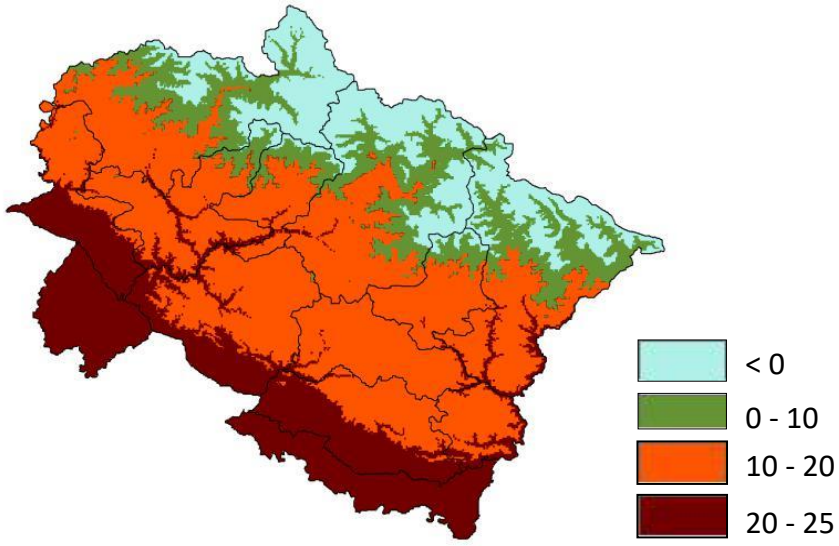
Climate

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 receives a good quantity of rains during the monsoon season and light showers during the summers. The average annual rainfall in the state is 1230 mm. 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 temperature dips below 5°C. The lowest temperature recorded in the state has been -5 to -7°C. There is a marked

difference in the climatic conditions of the areas situation 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 difference in the climate and vegetation found. In the upstream Gangetic plains, there are humid forests and there are savannas and grasslands in the dry lowlands.

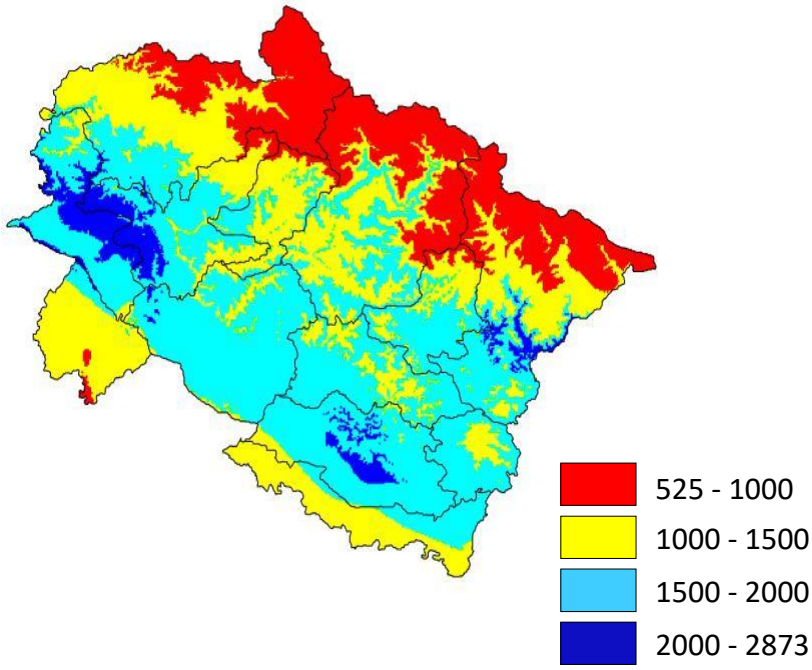
The average annual rainfall of the state varies spatially. For example, the average annual rainfall in Srinagar (Garhwal) is 920 mm whereas the average annual rainfall in Nainital is 2500 mm. However, the distribution and variation of rainfall depends on the geographical condition, slope and nature of 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.

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



Source : Uttarakhand State Action Plan on Climate Change, 2014

Map 4 : Annual average Rainfall (in mm)



Source : Uttarakhand State Action Plan on Climate Change, 2014

Trend of Climate Change

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 from sinking of coastal areas. Given the studies and results, there may be a significant difference in the methods and tendencies of the weather parameters from one place to another. There is a mixed trend in the whole of Uttarakhand in seasonal standards. 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.

The state is experiencing following changes in the climate scenario:

- 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 are increasing.
- The outbreak of vector borne diseases is increasing.
- The temperature is continuously 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 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 increase in seasonal air temperature in all seasons. It is also predicted that there is a chance of a temperature drop of 2.6°C in the winter months (October, November and December) in 2030.

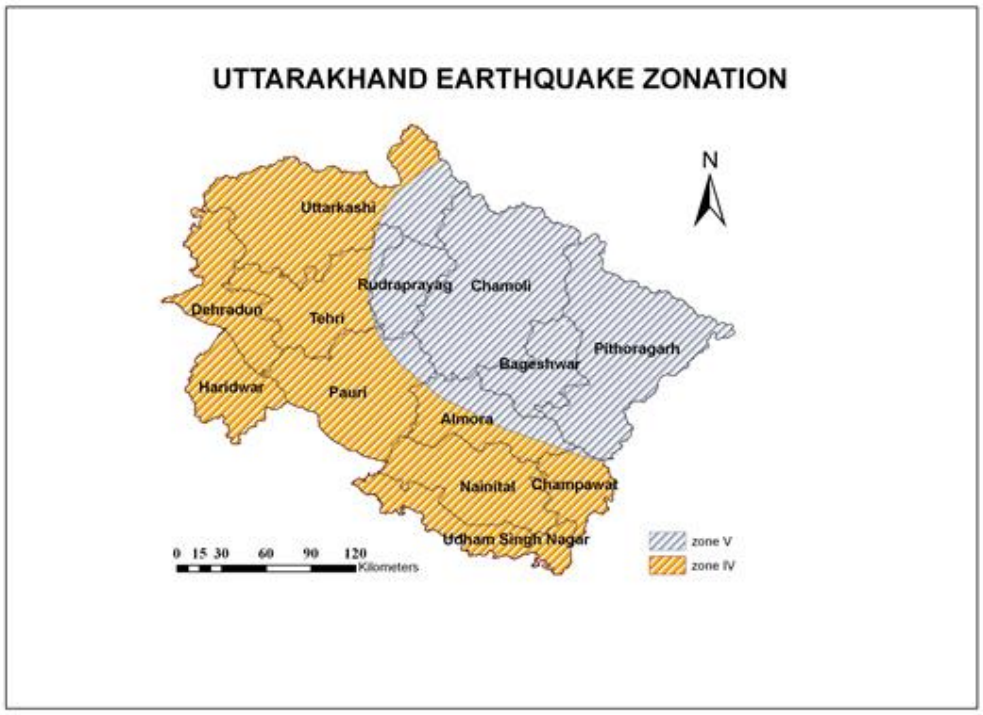
According to the PRECIS Model, the annual rainfall in the state can fluctuate, i.e., the annual rainfall of the state may be 1268 mm to 225.2 mm less or more and maximum 1604 mm to 175.2 mm less or more. According to these estimates about rainfall, the state is expected to get 60 mm to 206 mm more rainfall 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 annual 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.

State Sensitivity/Vulnerability in Relation 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, lightening, 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 of most proneness to natural hazards, namely earthquake, flash floods due to cloud burst, landslides, avalanches, forest fires and continuous drought disaster in the summer. With these recurrent calamities, there is a great loss of natural resources, basic infrastructure and human life in the state. Although the intensity of earthquake in Uttrakhand in the year 1991 and in 1999 in Chamoli was less but in the coming days, it was likely to become a major hub of earthquake in the state due to tectonic movements of continental plates. The growing population and the continuous infrastructure development has increased the state's vulnerability in the context of earthquake. Here are some key points of state's sensitivity to note :

- According to Vulnerability Atlas of India, approximately 56 per cent of homes in Uttarakhand are made of clay, raw bricks and stones. The above data shows the state's very high sensitivity in disasters like earthquake, landslide, accelerated flooding and cloudbursts. According to the figures in India's Vulnerability Atlas, this state comes under the most seismic risk areas of the country.

Map 5 : Uttrakhand Earthquake Zonation map



- The frequency of landslide event has increased due to its topographic c and the climate conditions of the region. The process of rapid deforestation, construction of dams or reservoirs, housing scheme, road construction in Uttarakhand has increased the vulnerability of the state to earthquake and landslides. Every year this is causing extensive damage to life and property. The major landslide events in various parts of the state noticed in the years 1979, 1986, 1998, 2002, 2004, 2008 and 2009.

- 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, flooding in the low-lying areas is more frequent which induce soil erosion. The rapid pace of deforestation in the Himalayan region for construction have also caused flash flood during the monsoon while in other months the state also experiences drought condition. The increasing soil erosion, have also reduced the water holding capacity of the rivers due to siltation or rising of river bed.

- The cases of extreme rainfall events due to cloudbursts induces flash floods and breaching of dam/ embankment 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.

- More rainfall in fewer days is now become a new normal which causing flash flood and landslide. Sometimes excessive rainfall in the upper reaches of the mountains, cause flooding in low lying areas. Such flooding sometimes cause more damage compared to usual floods.

- Man-made and natural factors are responsible for increasing drought condition in the state. Due to climate change, the state is not receiving normal rainfall. In the last few years, it has been observed that due to some man-made activities such as, deforestation, excessive tapping of ground water, and pollution, the conditions of drought have become more prominent in the state.

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.

2.4 Institutional Arrangement

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.

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/ organizations. In addition to these developments, the Ministry of Disaster Management under the 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, was started under the 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 members. The Disaster Management Department is responsible for the guidance of disaster related matters, prior preparation, mitigation, relief, rehabilitation, restoration etc. work in Uttarakhand. The Chairman of the Executive Committee on Disaster Management in the state of Uttarakhand is Chief Secretary, Uttarakhand.
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 all the stages of the disaster – pre-preparation, mitigation, relief, rehabilitation, and restoration – in light of the directions from the state disaster 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

Uttarakhand State Disaster Management Authority (USDMA)

Just like at the national level, there is an institutional framework for disaster at the state level as well. In Uttarakhand, many initiatives have been taken to prepare the institutional structure for disaster management. The Disaster Management Authority has been constituted in Uttarakhand under the Chairmanship of the Chief Minister. The responsibility of management of various types of disasters falls on the Department of Disaster Management, which acts as a nodal office for disaster management in the state. The implementation and supervision of disaster management activities in the state is done by the Chief Secretary, Department of Disaster Management. In the event of emergency, the task of marking and nominating various nodal departments is done by the Chief Secretary (Disaster). The State Disaster Management Authority carries out the following key activities:

- For all the aspects of disaster management for Uttarakhand – work on assessment, planning and implementation of schemes related to prevention, mitigation, pre-preparation and response.
- Ensure better coordination between the state and the centre during the event of disaster.
- In the whole of Uttarakhand, covering all the units and agencies of the government, forming a uniform control, direction and coordination framework so that in order to respond in an emergency, pre-preparation, mitigation and prevention activities can be smoothly edited.

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 Uttarakhand State Disaster Management Authority. The emergency telephone number for the State

Emergency Operation Centre is 1070. The State Emergency Operation Centre will be in intensive coordination with all types of natural and man-made threats and technical agencies responsible for any disaster. 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.).

Main Responsibilities

The following are a few of the main responsibilities of the State Emergency Operation Centre :

- Coordination with various local technical agencies issuing prior warnings of various hazards.
- 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 previous warning and especially during the disaster.
- Ensuring 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 participation of the District Magistrate is necessary at the stages of counter notification and rehabilitation.

District Disaster Management Authority (DDMA)

A District Disaster Management Authority was established in each and every district. In this 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 implementation 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) Deputy Development Commissioner – Ex-Officio Member
6) Additional District Magistrate (Finance/Revenue) – Ex-Officio Member
7) Senior engineers of the district – Ex-Officio Member

Additional 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 sensitive sites in the context of 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.

2.5 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 arrive 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 Irrigation Department on which the department needs to work –

Issues and Challenges

- Communication and coordination with various related departments during the time of disaster emerges as a major challenge.
- Coordination with Irrigation Department is not established during the structural development done by other department on the banks of the rivers.
- The departmental employees lack efficiency regarding the operation of latest techniques on irrigation and flood control.
- Not having proper budget for maintenance and repairs of departmental structures like Flood Protection Wall etc.
- The complex process of getting budget for the disaster prevention work of the district disaster management authority and not getting the budget in time is a big challenge.

Steps 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 :

- Conducting coordination meetings from time to time with all concerned departments/agencies.
- Train departmental staff over rescue, relief and other departmental technical competencies with disaster.
- Increasing the money on the maintenance items for various types of mitigation measures to be settled on a priority basis.

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

The Irrigation Department, responsible for water management in the state, is an important department in view of the disaster, and being a major responsible department for the rivers and its related activities, its role is more important than other departments in the disaster. Flood/flash flood, landslide or cloudburst, any kind of natural disaster, the Irrigation Department has direct linkage to it. Therefore, in such a situation, the work done by the Department in various phases becomes very important. Before the disaster, the Department, which adopts various immediate or long-term measures to prevent disasters, also plays an important role during and after that. In this chapter of the document, discussions related to the activities of the department are discussed in various stages of the disaster. Along with this, SOP has been prepared on the guidelines for editing activities in different phases. (Annexure No. 1)

3.1 Pre disaster Action (Prevention, Mitigation and Preparation)

To reduce the effects of any disaster, prevention, mitigation and pre-preparation measures and activities proved to be very effective. These are activities that are going on for a long time and which can be incorporated with the developmental activities of the department. Therefore, along with the daily activities of the Irrigation Department, they can adopt other such measures, which can be helpful in reducing the impact of disasters. It is compulsory to integrate these activities with the department's generalized developmental schemes/programmes. Under these measures, those points are kept which work towards reducing the impact of the disaster and increase the ability of the department and the community to deal with the disasters. Pre-preparation under the Irrigation Department is an important step, where on the basis of their daily activities, along with identifying sensitive areas, the department can control the conditions of the disaster to a great extent by ensuring timely storage of necessary materials to protect against floods and other disasters. By adopting these pre-preparedness measures, the impact of disasters on the Department and departmental damage can be minimized.

These activities are continued throughout the year under various schemes/programmes run by the department and financial arrangements are made from various items for editing them. In addition to this, for the determination of activities for disaster prevention, mitigation and strengthening of staff by organizing through the District Disaster Management Authority, the Additional District Magistrate (Finance/Revenue) will provide proper funding through the Disaster Management Department.

Activities to be executed under this stage are as follows :

Identification of Sensitive/Vulnerable Areas and Scheme Planning

Planning for prevention and preparation for disasters is a necessary component. Identifying sensitive areas/districts based on sensitivity assessment and working on priority basis in those areas is an effective step towards reducing the effects of

the disaster. The sensitivity of the region or district has been determined on the following grounds :

- Based on the statistics provided by the department on disaster incidents and the damage caused by them – On the basis of information received from the department and data provided by the department, the 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 :

- Constitute a Disaster Management Team from the state to the district level and appoint a Nodal Officer within the department so that coordination with other departments can be established.
- To meet the minimum requirements of IRS for flood, landslide and accelerated floods, such as - ensuring the appointment of competent authorities and other personnel in planning, logistics and operation wing and make their information available to the State and District Emergency Operation Centre. (Order No. 1501/XVIII – (2)/16-13 (5)/2007 Date: 21 June 2016)
- Ensure the identification of the most sensitive zones in terms of disaster.
- Ensure the constant monitoring of embankments.
- Release circulars from the Executive Engineer level to all the assistant engineers to be present at the Headquarters.
- Be sure to manage sand erosion in place of embankments so that they can be used in case of erosion.
- Issue tender to ensure the repair of potential damage even before the monsoon.
- Ensure the supervision of the machines and vehicles available at the departmental level.
- Ensure the availability of fuel (diesel) for the vehicles and machines.
- Splitting petrol pumps and human resources for machines and diesel on a sectoral basis.
- Prepare a list including all departmental officers, employees' names, addresses and contact numbers.
- Identify other vehicle owners in addition to the registered vendors.
- Establish coordination with another division.
- Giving the information to the Disaster Management Authority, ensuring that there is no threat to life and environment related to the Authority and responsibility and obligation of the Authority.
- Coordinate with the respective responsible departments/agencies for the maintenance of all the dams/barrages constructed at the state level, plan for proper security.
- Meeting the coordination with the departments/agencies responsible for the security and supervision of all the dams/barrages established in the state

before the monsoon, discuss their specific standard operating procedures for their work and to determine the strategy.

Infrastructure Strengthening and Human Resource Development

Keeping in mind the disasters in the state of Uttarakhand, it is necessary to ensure structural restructuring and adequate system of human resources along with assessing requirements in the development schemes within the department. Under this, in the activities undertaken by the department, on one hand, where strengthening of departmental buildings/staff quarters 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 following activities are recommended under this :

- Ensure that all the newly constructed office buildings be constructed at the safe places in the sight of disaster.
- To ensure that no interference/encroachment is made in the streams for the natural drainage system.
- Dissemination and implementation of flood protection wall along river banks in extremely sensitive areas in view of erosion _.
- Ensure that the contractor should hire equipment and human resources from the registered contractor on the basis of the tender.
- With the help of the Central Water Commission, Disaster Mitigation and Management Centre, Irrigation Department and Meteorological Department and other departments/institutions, keep constant information about the flow of rivers in such areas and by collecting information from different sources and establishing public address system, ensure proper measures to safeguard public money by emptying such areas immediately before the floods arrive. So that there are no unnecessary delays in rescue work. (1501/XVIII-(2)/16-13(5)/2007 Date 21 June, 2016)

Need Assessment and Capacity Building

Capacity building of staff and community under on disaster response of the department is an important element. Given the change in the nature of the disaster, it is necessary to conduct training/orientation on certain subjects for capacity building of each level. This is necessary since the community directly faces any disaster. Therefore, 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 in the document :

- Ensure participation in mock drill by disaster management.
- Ensure the provision of training of departmental staff at the department level.
- Be aware of the situation of the rivers through newspapers or other means of running awareness campaigns for the effect among the community and keep distance from the rivers in possible times.

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 3: 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 4: 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 metres, less than high flood level and above danger mark)
Second	High flood (water level below high flood level but at 0.50 metres 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 5: 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 avalanches, the Snow and Avalanche Study Establishment of the Defence 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 6 : 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 or its earlier warning 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 7: 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 During the Disaster

At the time of disaster various preparations have been discussed to deal with the disaster. Under this, the formation of the disaster cell and the disaster team and the appointment of the nodal officer is done in accordance with the standards of the Emergency Response System (ERS). According to the ERS standards, the team works in response to disaster while dealing with various associate departments. The Triggering Mechanism has been prominently included in the Response action, which makes the implementation of the Response action successful.

Triggering Mechanism

Under the triggering mechanism, the situation is such in which all 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 period are those which are self-motivated activities to eliminate the effect of the disaster and those that can be induced instantly in the direction of reducing the losses. The main purpose of creating 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 can vary for natural disasters in different situations i.e. where the pre-warning system is available, the triggering mechanism will be different while the areas where the early 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 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 administrative mechanism to be prepared with their available human and other resources to respond to the situation of the disaster.
- Broadcasting of warnings to potential communities affected by disaster and their safe withdrawal 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.
- In view of the possibility of disaster, the District Disaster Management Authority/District/Local Administration will do the work to clear the people from the disaster site. For this, a comprehensive order will be issued at the state and district level and all necessary pre-preparations will be ensured.
- After this, all the concerned officials at all levels will be followed-up so that they are ready to respond to the disaster situation.
- Standing orders related to disaster and pre-preparedness will be reviewed on an annual basis and the reviewed standing order will be broadcast among all concerned.

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.

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

In places where no pre-warning system related to natural disaster is working, there is a triggering mechanism to work under a specific procedure for clearance and relief work at the immediate level. 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.
- 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)

Incident Response System (IRS) is the effective system for working systematically during response. Keeping in mind the highest level of disaster, all the tasks to be performed in view of the possible problems are included. Keeping in view all possible response requirements under the Incident Response System, a team has been formed by involving officials from different sections and departments, who will work to fulfill their fixed responsibilities. All the members in the team know their responsibilities, actions and role. According to the state's administrative structure and the Disaster Management Act 2005, the RO/Incident Commander will be in-charge of the whole incident response management at the state and district level. IRS will work at all levels – state, district, tehsil and development block. Under the IRS, a nodal officer will be appointed from the Department of Health, who will be responsible for disaster related work within the department. Along with this, she/he will have a fixed role in the IRS as well.

Activities Performed by the Department during the Disaster

During response, the Irrigation Department conducts the following key activities –

- To ensure issue of high alert in the event of water flowing above the river's danger mark.
- Increase the patrolling of the Junior and assistant engineer to ensure the duty to be monitored at night.

- Issue of warnings in case of river water flows above the danger mark.
- In case of disaster, informing the gangmen and local technical – non-technical staff.
- Ensure the drivers of nearby machines to carry them there.
- To coordinate with concerned departments for the removal of debris and improvement of traffic system.
- In the event of a major disaster, demand for machines from the district administration so that they can be sent to do work even outside their scope.
- During the disaster, stay in regular contact with the Disaster Control Room and keep in touch with the situation.

3.3 After the Disaster

The key activities carried out by the department in this phase are as follows:

- Assessment of departmental damage, make sure to prepare the loss estimates and reach the government level.
- To ensure the repair of damaged embankments.
- Ensure the cleanliness of wreckers blocking the natural water course
- Ensure the repair of rivers and flood-resistant structures.
- Ensure the construction of flood protection wall under flood protection scheme in damaged areas.
- Review the works done during the emergency with local people, committees, and beneficiaries. Detect deficiencies and include it in future action plans.
- Help people recover from the effects of disaster and go to a better position, in the recovery and rehabilitation work.
- Completion of those tasks which are in minimum expenditure immediately after the departmental budget.
- Assessing the damage announced by the government and review of the recovery package and the requirements.

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 deficiencies 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 preparation and upgrade departmental coordination during emergency, mock drill may be a better method of rehearsal testing. It will be based on past experience of disaster and learning received. On one side of the mock drill, we will be able 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 our plan, but if necessary, the department will also be helped 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 department should certainly perform the following tasks :

- Adding the activities of mitigation and prevention in the departmental annual work plan.
- Developing performance index involving time limit and expected results. This index should be both quantitative and qualitative.
- Execute mitigation and prevention plan.
- Conduct quarterly review of programmes operated at the state and district level.
- Review pre-preparedness and reaction mechanism.
- Preparation of index of pre-preparation and response results.
- Provide review and feedback at the state and district level after the disaster.
- Training of officials on disaster management through the medium of State Disaster Management Authority/District Disaster Management Authority.
- Update the District Disaster Management Authority at the end of April every year.

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 Role and Responsibility of State Units of the Department and the State Emergency Operation Centre in Monitoring and Evaluation

Local Level Implementation of Departmental Disaster Management Plan

- Marking 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 take approval from the concerned officials 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, pre-preparation and response are being implemented correctly within the district.
- Identifying the activities funded by the Central or State government that can be used for disaster management by the head of the department at the state level. 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.

4.3 Documentation of Learning

Updating the Plan

Departmental Disaster Management Plan is a “living document” and according to the State Disaster Management Act 2005, before May each year, the state level departmental head or nodal officer (disaster) will update this document with the help of departmental disaster management team. Following the guidelines approved by the Uttarakhand State Disaster Management Authority in updating this document, the following points will be considered :

- Identifying and listing of sensitive/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 of 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 included. A few case studies related to disaster management plan should also be included in this document.

Evaluation Post Disaster

The Food, Civil Supplies and Consumer Affairs Department will evaluate its performance based on the tasks related to its department. After the relief and rehabilitation activities are completed after the disaster, the department should carry out the following evaluation tasks–

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

4.4 Index for Monitoring

The following checklist can be helpful for monitoring the work done by the department in various stages of disaster:

- Organise a meeting in May and October on natural disasters.
- Conduct awareness drives.
- Form zone/all zones.
- Assess the progress.
- Keep the equipment ready.
- Constitute a team.
- Arrange for vehicles.
- Area-wise deployment of staff, gangmen etc.

Table 8: Monitoring Index for Different Stages

Early Warning Broadcast **Pre-Preparedness**	**Yes**	**No**
▪ Cancel all the holidays and immediately ask the concerned individuals to report at the headquarters. ▪ Arrange all the important telephone lines and numbers in order.		

▪ Arrange Vehicle (Jeeps or Trucks) to broadcast warning and information to the people living in vulnerable/sensitive areas. ▪ Keep a systematic record of information received and disseminated. ▪ Establish coordination with the district administration. ▪ Deployment of the concerned staff to keep information updated about scoring, piping, seepage etc. along with the velocity of water flowing in rivers and water level, if possible. ▪ Record the rain and submit report to the District Control Room.		
Restoration of Infrastructure		
▪ Identify fragile/sensitive areas. ▪ Repair of vulnerable roads and embankments.		
During the Disaster		
Restoration of Infrastructure		
▪ Protection of vulnerable roads and flood protection walls. ▪ Repair of pipes and seepage found in vulnerable areas. ▪ After the disaster, arrange for the construction materials for the repair of cracks in flood protection walls and roads.		
After the Disaster		
Broadcast of Early Warning		
▪ Estimation of the damages. ▪ Identify areas which require cleaning. ▪ Constitute a team. ▪ Monitor the work. ▪ Send a proposal to the government for repair and restoration.		

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 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 completed 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 area damages 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 finds 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 pure relief, funds are issued as per the specific Relief Commissioned/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 specific Relief Commissioner.

References

1. Climate Action Human Health Utrakhand
2. Himalayan Geology 20(2) 1999 page,71-85
3. Utrakahnd State Action Plan on Climate Change
4. Vedika Pant, CBDRA" A case studies from Utrakhand" (Kumaun University Utrakhand)
5. www.gov.ua.nic.in
6. www.sodhgaya.inflibne.ac.in
7. www.Utarakshi.nic.in
8. www.Pithrogarh.nic.in
9. www.Rudraprayag.nic.in
10. www.haridwar.nic.in
11. www.ndma.gov.in
12. NDMA, GOI 2016" Guidelines for preparation of action plan
13. IRS Guidelines
14. www.sphereindia.org