

Ddmap, District Disaster Management Action Plan For Hill District Uttarkashi, (Uttarakhand)

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Abstract Present investigations were carried out on the Disaster Management Action Plan of Uttarkashi district (Garhwal Himalaya). Situated at 78° 26' E and 30° 44' N at an elevation of 1150 Mts. Above sea level on the bank of Bhagirathi river. The district is located in the most sensitive zone (zone 5) of the Himalaya. The main central thrust and the main boundary thrust lines are passing through the district. It was main focal point of the earthquake disaster in 1991 (6.4 in Richter scale). The district also faced the heavy flood in 1978, 1997 and 1998, mass land slide in Varunawat hill in 2003, 2007 and 2007, in Bhatwari village in 2011. Thus the possibility of earthquake, flood and land slides are always there. The DDMAP address the district responses to disaster situation such as land slides, earthquake, forest fire, flash flood, cloud bursting and road accidents, from these disaster some are causing extensive damage to lives and environment. The present paper highlights the planning steps of disaster management plan for hill districts (Uttarkashi). By following the disaster action plan; we can prevent or can minimize the impact of disaster and can save the lives and properties as much we can.

(Key words: *Earthquake, Flash Flood, Forest fire, Himalaya, Land slide, Management and Uttarkashi*)

1 INTRODUCTION

Uttarkashi is a border district of the state of Uttarakhand. Situated at 78° 26' E and 30° 44' N at a distance of 155 Km from Rishikesh, at an elevation of 1150 Mts. Above sea level on the bank of Bhagirathi river. This town is also the district head quarter. Covering an area of about 12.02 Sq. Km. the Township of Uttarkashi has a total population of about 18220 approx (2011 census). The district is located in the most sensitive zone (zone 5) of the Himalaya. The main central thrust and the main boundary thrust lines are passing through the district. Village Jamak and Agora was main focal point of the earthquake disaster in 1991 (6.4 in Richter scale). The district also faced the heavy flood in 1978, 1997 and 1998, mass land slide in Varunawat hill in 2003. Thus the possibility of earthquake, flood and land slides are always occurs there. In Garhwal Himalayan Mountains landslide and earthquake have been major and widely spread that strike life and property almost perennially year after year. Landslide are estimated to cost more than US \$ 1 billion in terms of economic losses and cause more than 200 deaths each year in the Himalayan region (Li Tianchi, 1996). Bansal and Mathur (1976) have estimated that on an average the major landslides in the Himalaya result in an annual loss of more than 50,000 man hours and 5000 vehicle hours per kilometer of road per year due to disruption of communication alone. Kimothi and Juyal (1996), while studying the frequency of landslide in the watershed of Alaknanda Valley made an assessment that deforestation was the major factor responsible for acceleration of landslides in Himalaya. (Bansal and Mathur, 1976) also studied that in India on an average about 10 small to medium landslides occur in every Kilometer length of hill road and on an average each of these slides through 500 cu.m (1,75000 cubic feet) of debris on road Disaster often affects a variety of system including losses of human lives.

These effects commonly occur differently both in rural and urban areas according to infrastructure and physical settlement. In rural area the effect of disasters are in the form of disruption in irrigation system, agricultural land and loss of human and animal lives, while in urban areas the disaster shows the result in the form of damage of communication system, electricity supply, drainage system and fuel stations. Therefore in absence of a well- defined action plan to be implemented during the time of a disaster, such disaster can create mass destruction. It requires a well-defined and well thought of Action Plan to keep the loss of lives and properties to a minimal possible extent, and it is only possible by the District Disaster Management Action Plan (DDMAP), which should be different for different cities according to their physiographic conditions. Through the DDMAP the following objectives can be achieved.

- Regular monitoring of disaster prone sites through the modern instrument and manually.
- Allocation of specific responsibilities to the various agencies involved.
- Listing out proper sequence of action to be taken during such an emergency and preplanning or pre determining of response actions.
- Effective management of the available resources.
- Developing the standard operating procedure for perfect co-ordination among various department and relief agencies involved.

The concept behind the formulation of district disaster management action plan is to save the lives, properties and environment: provided quick relief in the affected areas and restore normally at a faster pace. The DDMAP address the district responses to disaster situation such as earthquake, land slides, forest fire, flash flood, cloud bursting and road accidents, from these disaster some are causing extensive damage to lives and environment. The present case study shows that the district disaster management action plan is a multi response plan for disaster and outlines, the institutional framework required for managing such situations. However,

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the plan assumes a disaster specific form in the terms of action to be taken by the various agencies involved in the disaster.

2. PHYSIOGRAPHY OF STUDY AREA

Uttarkashi meaning Kashi of the north is a holy town in Uttarakhand, India. It is the district headquarters of Uttarkashi district. Uttarkashi is situated on the banks of river Bhagirathi at an altitude of 1352 m above sea level. Uttarkashi is home to a number of ashrams and temples and also to the Nehru Institute of Mountaineering. The name of the town reflects its similarity to and location (as north of) the city of Kashi (Varanasi). Similar to Varanasi, town of Uttarkashi is situated on Ganges, lies next to a hill named *Varun Parvat*, on confluence of two rivers *Varuna* and *Asi*, has a ghat called Manikarnika Ghat and has a temple dedicated to Shiva (Kashi Vishwanath Temple) in the center of the town.

GEOGRAPHY

Uttarkashi is located at 30°44'N 78°27'E It has an average elevation of 1,165 meters (4,436 feet). most of the terrain is hilly. RIVERS- there are many small and big rivers in Uttarkashi district. Yamuna and Ganges(Bhagirathi) are biggest and holiest among them, their origin is Yamunotri and Gangotri(Gomukh) respectively. Asi ganga , jad ganga are some of the tributaries of Ganges.



Location Map of Uttarkashi District

*Source: Uttarakhand govt., official website, www.gov.ua.nic.in

GEOLOGY

Uttarkashi town is in Garhwal Lesser Himalaya and is situated south of the Main Central Thrust (MCT) which passes near Sainj. The area lies in the high seismotectonically active zone (seismic zone V). The MCT zone has witnessed two major earthquakes since 1991. The epicenter of the 1991 Uttarkashi earthquake was in the Agoda village of Uttarkashi town. The area was subjected to tectonic

movements due to which several faults and weak planes have developed in the region. The Uttarkashi formation includes Netala Quartzite, Lower Uttarkashi Limestone, Pokhri slate, Upper Uttarkashi Limestone and Bareti Quartzite (Jain, 1971). The rocks found in the Varunavat Parvat comprise mainly quartzite and phyllites of Damta Group which are highly shattered, fragmented and fractured and thinly jointed. These are covered with 20-25 m thick slided material. The beds are dipping at 30-35° towards N350° inside the hill slope. There are three sets of major joints while, the soils in this region are almost new, generally thin and porous in nature. The two major rivers Ganges and Yamuna have origin from the Himalayan region of this state and therefore the water resources are important assets of the state.

DEMOGRAPHICS

As of 2011 India census, Uttarkashi had a population of 16,220. Males constitute 57% of the population and females 43%. Uttarkashi has an average literacy rate of 78%, higher than the national average of 59.5%: male literacy is 83%, and female literacy is 71%. In Uttarkashi, 11% of the population is under 6 years of age. Most citizens of Uttarkashi are Garhwali, with large numbers of Punjabi, Kumaoni and people from other parts of Northern India. It also has a significant population of the Bhotiya Jadh people.

VEGETATION AND CLIMATES

Uttarkashi is bestowed with abundance of forests, which house a variety of wild life and plant species. The natural forest resources with unique biodiversity have played an extremely important and crucial role in the socio-economic development of the region. Uttarkashi is also famous for its Apple orchards and pulses it produces. The rain in the district instead of being seasonal is a regular feature. Average rain fall in the district in the past has been recorded as 121.02 mm. while the highest and lowest mean temperature observed are 32°C in the district and 3°C respectively.

AREA AND ADMINISTRATIVE DIVISION:

The district covers total area of 8016 Sq. Kms. The maximum stretch from east to west and from north to south being 154 Kms and 109 Kms respectively. It comprises of 04 Tehsils + 02 new Tehsils, 06 Blocks and 677 revenue Villages.

3. MATERIALS AND METHODS

Objectives:

In absence of a well defined action plan to be implemented during the time of a disaster, such disaster can create havoc. It requires a well- defined and well thought of action plan to keep the loss of human life and properties to a minimum possible extent through proper co-ordination of diversified agencies within the shortest possible time. This objective can be achieved through the following –

- 1) Listing out proper sequence of action to be taken during such an emergency and preplanning or pre determining of response action.
- 2) Allocation of specific responsibilities to the various agencies involved
- 3) Effective management of the available resources

- 4) Developing codes and standards operating procedure for smooth co-ordination among various department and relief agencies involved.

RISK ASSESSMENT:

Disaster Specific Proneness:

(I) **Floods and Landslides:-** Vast area of the district are prone to having landslides and flash flood, particularly during the raining season due to heavy rain or sudden cloud burst . such incidents have often been witnessed in the past at place Gyansu, Mori, and Agora and in the river Indravati. Similarly because of loose structure of soil in the mountain range along the banks of river Yamuna in Khaneda, there is always a possibility of heavy landslides in the area. The river at this place is about 10 feet wide and a sudden landslides can obstruct the flow of river Yamuna resulting in a flood like situation in the upper parts of the area.

(II) **Road Accident:-** The area being hilly, road accident like vehicles falling into the river or deep gorges may be due to mechanical failure, overspending or overtaking, often take place.

(III) **Fires:-** Almost 88% of the total area of the district is covered by forest. During the summers forest fires have often taken place in the past resulting in loss of animal life and vegetation.

(IV) **Earthquake:-** As mentioned that the district is located in the most sensitive seismic zone of the Himalaya and the main centre thrust and the main boundary thrust lines are passing through the district, The possibility of the district being rocked by an earthquake is inevitable.

DISASTER PROBABILITY:

The district is prone to following disaster in order of importance severity of damage are:

- a- Earthquake
- b- Excessive rains and cloud burst
- c- Land slides.
- d- Floods.
- e- Road Accident.
- f- Forest fires.
- g- Hailstorm.

RANKING AND PROBABILITIES OF DISASTER IN DISTRICT:

- (1) **Earthquake:-** Being situated in no 5 seismic zones and the main control thrust and main boundary thrust lines passing the district. The probability of an earthquake rocking the district is very high. It may result in wide spread loss of life and properties.

Date / Year	Place	Intensity
22,May,1803	Uttarkashi	6.0
20,October1991	Uttarkashi	6.6
March,1999	Uttarkashi	4.5
16,August,2005	Uttarkashi	4.8
14,December,2005	Uttarkashi	5.2

Earthquake in Uttarkashi

Source: *Uttaranchal year book, vinsur (2011)*

- (2) **Land Slides, Cloud burst and Flash Floods:-** The second probability of disaster episode in the district, after earthquake, is that of land slides. Cloud burst and flash floods resulting from heavy land slides particularly during the raining season, which may block the flow of water in various rivers or nits tributaries.

	Place	River
1978	Uttarkashi	Ganga
1999	Uttarkashi	Indravati (tributary)
2003	Uttarkashi	Jalkur (tributary)
2011	Uttarkshi- Tehri	Ganga

Flash flood in Uttarkashi

Source: *Uttaranchal year book, vinsur (2011)*

- (3) **Fires:-** As more than 88% of the total area of the district is covered by forest. There is always a possibilities of a forest fire raging, particularly during summers. It may not lead to loss of human life but it definitely destroys the precious forest wealth and some animal life.

- (4) **Storms:-** Normal storms or hail storms accompanied by high intensity winds result in falling of trees etc, which may block road, communication and adversely affects the water and power supply.

DISASTER MANAGEMENT ACTION PLAN:

Monitoring Prediction and Warning System:

There are no such systems for prediction of earthquake. However areas prone to possible land slides in the district can be earmarked and people residing in those areas can forewarned of any possible disaster by constant monitoring of such areas based on the weather forecasting so that loss of life and properties can be reduced to a minimum.

Existing Disaster Management Plan:

For the disaster prone area like Uttarkashi district, there should be always a existing emergency disaster plan foe better co-ordination among the various agencies in the district or the disaster sites, like- district disaster committee, tehsil / block disaster committee, village disaster committee, police force, RTO, mountaineers, swimmers and drivers and armed forces.

District disaster Control Room:

A District disaster management control room has been set up at district headquarter near the Collectorate. A telephone has been provided in this control room (01374-226126). All relevant and useful information pertaining to the subject and being obtained from various sources will be available in the control room. All the activities pertaining to rescue and relief operation at the time of any disaster will be control from here under the leadership of district magistrate. In addition such control rooms have also been established at tehsil and Block levels.

Community Education and Awareness:

At the time of possible disaster, the knowledge pertaining to safety and security is made public through pamphlets, news paper and loudspeakers under disaster risk management programme. And in peace time the awareness and safety programme should run by the local administration for trained the people to prepare them for possible disaster of particular areas.

Disaster Preparedness Programmes:

In summer season for forest fire and in rainy season for flash flood and cloud burst, the officer or officials are assigned duties in control room by way of roaster throughout the day and night. All departmental officers are instructed to keep all the resources e.g. vans, instruments, accessories, dozers, cranes etc ready, for controlling or minimizing the effects of disaster.

Involving Agencies in Disaster Management Action Plan:

The agencies that can be involved in disaster management action plan are:

Disaster	Agencies
Earthquake	IMD, NGRI, BARC, GSI
Floods	IMD, Irrigation Department.
Fires	Fire Brigade, Police, Forest Department
Climatic Disturbances	IMD

District Disaster Management Committee:

The district Magistrate shall form a district disaster management committee, which will assist the DDM in:-

1. Hazard analysis and reviewing the threat of hazard.
2. Risk analysis.
3. Vulnerability analysis and evaluation of the preparedness level.
4. Emergency management.
5. Management strategies.
6. And consider suggestion for improvement of the response documents DDMAP.

4 DISCUSSION

From the past, Uttarkashi district affected by the various disaster time to time. Basically it suffers from earthquake, flash floods and land slides. And for these disasters, there is no permanent solution, because this area comes under seismic zone and thrust line which caused earthquake. Rapid change in climate caused the flash floods and both flood and earthquake resulting in the land slides. So we can not stop them, but by a proper disaster management action plan we can minimize the loss of lives and properties and can control the intensity of any disaster. For a proper district disaster management action plan, the planning should be implemented according to the geographical, geological, climatic, demographic, administrative setting and available resources. Adaptation, improvisation and optimization are corner stones of any planning pertaining to disaster. It must be emphasized that the documents or manuals prepared as disaster management plan have a limited purpose. These can best serve as reminder of task and activities. Individuals

and agencies assigned specific responsibilities within this plan will prepare appropriate supporting plans and related standard operating procedures. Periodically review and update altering procedures and resource listing maintain an acceptable level of preparedness. But the most important thing is that, in any disaster a post-incident evaluation should be done after the withdrawal of relief and rehabilitation activities, to assess the suitability of disaster management action plan and to give it more viability.

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