

# Response to Uttarakhand Disaster 2013

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**Abstract:** Uttarakhand is one of the most vulnerable hill states to natural disasters. On 16-17 June 2013, the state suffered its worst disaster in the living memory with huge loss of lives and widespread destruction. As per the initial estimates the disaster claimed a massive death toll and numerous persons were reported missing. The disaster coincided with the peak tourist and pilgrimage season significantly enhancing the number of the casualties with attendant adverse impact on the immediate rescue and relief operations. The mountainous region of Uttarakhand forms part of the Himalaya, which is the youngest folded mountain range in the world. Consisting mostly of uplifted sedimentary and metamorphic rocks and tectonically very active, the region is extremely vulnerable to natural disasters. During the last 100 years, there have been a series of disasters in the Himalayan belt, earthquakes, flash floods and landslides being the major ones.

Due to its Geo-climatic and socioeconomic conditions, Uttarakhand is one of the most disaster prone states of the country. Natural hazards like earthquakes, landslides, avalanches, cloudbursts, hailstorms, glacial lake outbursts (GLOF), flash floods, lightning, and forest fires, etc. have been a cause of major loss to the region and the society. The entire state was hit by abnormally heavy rainfall, possibly due to the fusion of Westerlies with the Indian monsoonal cloud system, resulting in flash floods and landslides over a wide area. The districts of Bageshwar, Chamoli, Pithoragarh, Rudrapur and Uttarkashi were most affected by this disaster. The large population in several areas were cut off across the state and suffered due to shortage of essential commodities.

**Keywords:** Flash flood, Himalaya, Landslide, Rainfall and Uttarakhand

## Introduction

The Himalayan mountain range covers a widespread geographical area in India, covering the states of Jammu and Kashmir, Himachal Pradesh, Uttarakhand, Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, Tripura, Assam and parts of West Bengal. It extends from the Hindu Kush in the North West to Myanmar in the South East, covering a distance of about 2400 km. The Himalayas are among the youngest mountain ranges in the world. Consisting mostly of uplifted sedimentary and metamorphic rocks and tectonically very active, the region is extremely vulnerable to natural disasters. During the last 100 years, there have been a series of disasters in the Himalayan belt, earthquakes, flash floods and landslides being the major ones.

The Himalayan state of Uttarakhand is located between 28° 43' - 31° 27' N latitude and 77° 34' - 81° 02' E longitude and 13 districts (Figure 1). It also consists of 76 towns and 95 developmental blocks. The capital of Uttarakhand is Dehradun, the largest city in the region. The State includes 320 km long stretch of the mountains between the Kali River forming the Indo-Nepal border in the east and the Tons-Pabar valleys forming the eastern border of Himachal Pradesh in the west.

The geomorphology of the State is completely defined by the Himalayas, being completely landlocked. The State has a wide range of geomorphic features like cliffs, rocky slopes, waterfalls, major and minor ridges, river valleys, highly dissected denudational hills, moderate and low dissected denudation hills, river terraces, and

various fluvial geomorphic features like point bar, meandering scars, and natural levees.

The State is completely affixed by the complex geological setting. In this area, a large variety of rocks are developed in the central crystalline complex of the Greater Himalayas and the Lesser Himalayas, as well as the sub-Himalayas. The area is very sensitive towards mass wasting process. Several rivers which are lifelines to one of the most densely populated areas in the world (the Gangetic Plains of India) originate in this region. Rivers Ganga and Yamuna, which originate at Gangotri and Yamunotri respectively, are the most important rivers of the region.

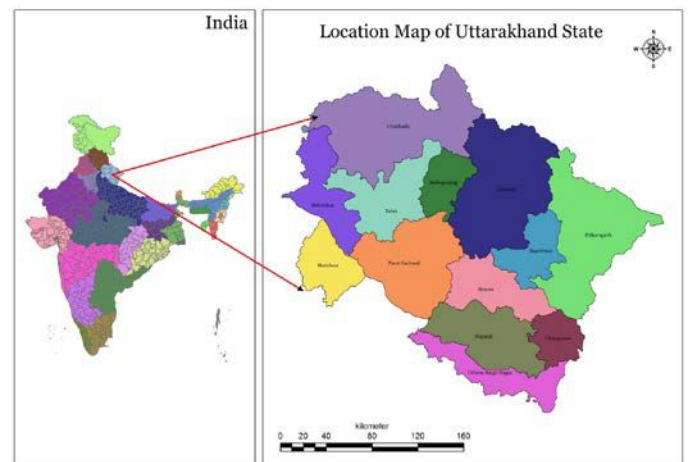


Figure 1: Location Map of Uttarakhand

### Disaster on 16-17 June 2013

On 16 and 17 of June 2013, Uttarakhand was severely hit by flash floods and associated landslides resulting in huge loss of lives, property, and ecosystems. All 13 districts in Uttarakhand have been affected by the floods of which five districts are the worst affected like Bageshwar, Chamoli, Pithoragarh, Rudraprayag and Uttarkashi. Uttarakhand region is among the country's most important pilgrimage circuits. As the disaster coincided with the peak tourist and pilgrimage season, it significantly aggravated casualties, people missing and affected. The large population in these districts was cut off from the mainstream and suffered a shortage of essential commodities across the State for a period ranging from certain days to a couple of weeks at different locations.

Monsoon this June 2013 arrived almost two weeks in advance than expected in the Uttarakhand. During 15 to 17 June 2013, cloudbursts and heavy (64.5 - 124.4 mm) to very heavy rainfall (124.5 – 244.4 mm) hit several parts of the higher reaches of the Himalayas in the State. Unprecedented rains resulted in a sudden increase in water levels, giving rise to flash floods in the Mandakini, Alaknanda, Bhagirathi and other river basins, and also caused extensive landslides besides aggravating the previous ones at various locations. Several villages and settlements such as: Kedarnath shrine area, Gaurikund, Rambara, Harsil, Uttarkashi, Guptkashi, Sonprayag, Srinagar, etc. suffered heavy damages.

Incidences of landslides along with erosion by the sediment loaded rivers breached of roads/highways at many locations and washed away bridges (steel girder bridges, beam bridges, suspension/cable bridges). Traffic was disrupted along all national highways and link roads besides disruption of telecommunication lines, all these delaying emergency response operations and creating grounds for lasting disaster impact.



Photo 1: Buildings damaged due to 16-17 June 2013 floods in Rudraprayag



Photo 2: Landslides in Rudraprayag - Guptkashi road

### Disaster Impact

The Uttarakhand Disaster 2013 caused irreparable losses of precious lives and damage of private properties, public properties, infrastructures, and many others. To be brief, more than nine million people were affected by the flash floods. The five districts namely Bageshwar, Chamoli, Pithoragarh, Rudraprayag and Uttarkashi of Uttarakhand were worst affected by the natural disaster.

The sudden flash flood caused the strong water current was the main cause of killing numbers of people. The fast, strong current loaded with heavy sediment, including boulders washed away a number of un-alarmed pilgrims and locals. Apart from flash floods, people were also reported to be killed by landslides, which buried them alive under huge debris and rock falls. In addition few people died due to scarcity of food, water and medicine. The difficult terrain and blockage of roads made it difficult to provide necessary relief to the survivors, stranded at difficult isolated locations in time. The harsh weather conditions, i.e. continuous rainfall, chilling cold and non-availability of proper shelter/clothes had also been to some extent responsible for large number of casualties during the disaster.

The disaster had affected all sections of the local people as well as tourists/pilgrims due to disruption of the roads and bridges. People remained stranded for a number of days after the disastrous flash flood events. Many sick people died because roads were damaged and disconnected of the affected areas and the necessary medical help could not be provided to them in time. Road connectivity to approximately 4,200 villages in the Uttarakhand was lost and they remained disconnected and isolated. The impact of the calamity had reached further downstream areas throughout the State, where the damages to roads were caused by inundation and overtopping of roads due to downstream floods. Damaged roads would require a realignment at a number of locations and the widened rivers would require longer bridges.



Photo 3: Many houses damaged due to landslide in Devprayag, Uttarakhand



Photo 4: Residential buildings damaged due 16-17 June, 2013 flood disaster in Srinagar

### Disaster Response

Search, rescue and relief operations during Uttarakhand disaster was the most difficult operation carried out in the India's recent history of disaster management. Various Central and State level government and even non-government agencies played significant role in making this operation successful despite of remarkable, odd situations like difficult terrain, adverse weather conditions, disrupted road and other connectivity. Various ministries/agencies of Central Government., departments/agencies of State Government., government of other states, NGOs, and corporate sectors, all helped in carrying out the operation.

### Government of India Initiatives

Ministry of Home Affairs, Government of India provided necessary support in managing the Uttarakhand Disaster in more effective and efficient manner. All the relevant Central ministries were mobilized as soon as the matter came to the notice. The National Disaster Response Force (NDRF) was asked to send their teams to Uttarakhand on June 16 itself. The Home Secretary took a meeting of senior officers of NDRF, ITBP, BRO, Ministry of Defence and other ministries on June 17-19 to make on the spot review of rescue and relief operations. National Executive Committee meetings were held to review the status of ongoing rescue and relief operations on July 1, 3, 8 and 10, 2013. In addition, National Crisis Management Committee also took a review of the situation in the State on day-to-day basis.

The Government also supported the State Government in carrying out its rescue and relief operations by providing support of the Army and Paramilitary Forces, including NDRF. In brief, NDRF deployed 14 teams of personnel, ITBP 1200 and the Indian Army 8,000 pursuing to carry out the one of the most difficult rescue operations in the history of the disaster management in the shortest possible time. In addition to human resources, the Government of India provided necessary support in the form of deployment of 45 helicopters of IAF and 12 helicopters of the Indian Army. The State Government also used a number of civil aircrafts for evacuating the stranded people. To restore the communication, 105 satellite phones were distributed by the Government of India to various Central and State agencies in order to facilitate communication.

To assist the State Government, Government of India deputed a high level team of medical personnel to visit the State and review/advise the State Government on all preventive measures to be taken. It also supported the State Government by providing support of 80 medical doctors, 11 psychiatrists and 5 public health teams in addition to various equipment, etc.

As far as the financial support is concerned, the Government of India has released an amount of Rs. 145 crores from State Disaster Response Force (SDRF) and Rs. 250 crores from National Disaster Response Force (NDRF) to the State Government. In addition, an amount of Rs. 1187.87 crores of assistance from NDRF was approved by the Uttarakhand Government subject to adjustment of 90% of the balance available in SDRF. Besides this, Rs. 20 crores was also approved for release to the Uttarakhand Government as a special component of National Rural Drinking Water Programme. For long term re-construction and rehabilitation Government of India has constituted a Cabinet Committee under the chairmanship of the Prime Minister for providing broad guidelines for re-construction and rehabilitation of disaster affected areas of the State.

An inter-ministerial group has also been set up under the chairmanship of the Cabinet Secretary for drawing up a time-bound National Plan for supporting rehabilitation and re-construction work. The Planning Commission is coordinating with the State Government for developing

a comprehensive reconstruction and rehabilitation package. In addition to the above, the World Bank and the Asian Development Bank are also in the process of extending assistance towards re-construction of the disaster affected areas of Uttarakhand. As ex-gratia payment of relief to the victims, the Central Government extended assistance to the State government by providing an amount of Rs. 1 lakh from NDRF and Rs. 2 lakhs from the Prime Minister National Relief Fund for each victim.

#### **Government of Uttarakhand Initiatives**

During the complete crisis period the Uttarakhand Administration did its best to manage the calamity notwithstanding the gigantic proportion of the disaster in the difficult terrain and inclement weather conditions. Soon after the disaster struck, the State Government initiated massive rescue and evacuation operations with the help of various Government of India and State Government agencies to include Army, Paramilitary Forces, National Disaster Response Force (NDRF), etc.

During the initial stages, advisories were sent to all the concerned districts and announcements were made by the police personnel station at Kedarnath, Rambada and Gaurikund alerting the general public. The State Administration stopped further movement of pilgrims from Rishikesh to higher areas. The State Government requisitioned the services of the Army, Air Force and Central Paramilitary forces (ITBP, NDRF) on June 16 itself.

A Coordination Committee under the Chief Secretary was formed in which Government of India's officers, Principal Secretaries/Relief Commissioners of other states, and all officers associated with disaster relief functions were made members for taking daily reviews. The entire rescue and evacuation operations were a joint effort both by the Government of India agencies and the State Government. Other State Government agencies such as the Police Department, District Authorities, NGOs and volunteers also helped in these operations. Given the most arduous and difficult terrain, inclement weather and major lack of connectivity, approximately 1,50,000 persons stranded/trapped in different locations (which included both pilgrims and local residents) were safely rescued by airlifting, transport, ponies/mules or by foot and taken to the relief camps. The pilgrims thereafter were helped to board trains, buses or take their private transport/taxis etc. to arrive at their home stations. The major part of the evacuation was accomplished in less than a fortnight making it one of the largest, swiftest and safest rescue/evacuation operations of the civil administration.

All the essential supplies like food, drinking water, medicines, kerosene oil, solar lamps, etc. were continuously provided by airdropping as well as by surface means (transport/mules etc.) wherever connectivity was available. A total of 69 relief camps was run where 1,51,629 pilgrims/local residents were looked after. Some camps continued operating beyond the emergency phase for the local residents. The State Administration ensured that there was no shortage of essential commodities. Difficulties, however, were faced at times because of

inclement weather when airdropping became difficult. Approximately 900 trucks of relief material were received from other states and dispatched to the affected districts from a nodal/central relief centre which was set up in Dehradun.

About 43 medical teams comprising of 313 doctors and 4977 para-medical staff were deployed and essential medicines, bleaching powder and chlorine were regularly supplied. Government of India deputed a high level team to visit the State and review/advise the State Government on all preventive measures for ensuring public health. It supplemented the State efforts with 80 doctors, 11 psychiatrists and 5 public health teams, besides, certain equipment such as water purifiers, etc. The Health Department had sent a team of doctors in order to prevent any outbreak of any epidemics or infectious diseases. There were no incidences of outbreak of any epidemic or infectious diseases occurred in the State in spite of the mass cremation of dead bodies and disposal of animal carcasses which might generate chances of contamination and result in some epidemic/outbreak of infectious disease.

In view of the enormity of the disaster the State Government revised upwards ex-gratia and GR entitlements, etc. The Prime Minister announced a relief package of Rs. 1,000 crores. In addition, the Prime Minister also announced Rs. Two lakh relief for the next of kin of individuals who lost their lives during the disaster from Prime Minister's National Relief Fund (PMNRF).

Besides these, the State Government initiated additional relief measures:

- Substantially raised the amount of ex-gratia under different components
- Sanctioned Rs. two lakh or proportionately higher amount for the loss of commercial properties
- Free ration to the disaster affected families for a period of 3 months or till the restoration of regular supplies
- Payment of rent at the rate of Rs. 2,000 per month for all those rendered homeless by the disaster
- Extraction of water tax, electricity dues and interest on Agri-loans given by cooperative banks this financial year. A moratorium of one year provided for repayment of loans to the cooperative banks.

The State Government established a Missing Persons Cell on June 27 at Uttarakhand Disaster Mitigation and Management Centre (UKDMMC). The missing persons' data were managed with the support of IBM professionals. Facebook and Twitter accounts were opened, where state-wise photographs and other accounts were posted which provided a very successful backup. Nearly 43,000 calls were made from the call data received from DoT of the calls made between June 14 and 19 on the mobile phones of the pilgrims. A thorough combing operation was carried out with the help of the Army, ITBP, NDRF and local police to locate any missing persons or dead bodies, particularly in the Kedarnath – Gaurikund sectors.

### **The Indian Army**

The Indian Army has a sizeable deployment in the State of Uttarakhand. Consequent upon the disaster in the State, the Army responded with speed and promptness. Troops located in the affected area were deployed without awaiting formal requisition. The footprint was gradually increased to cope up with the unprecedented humanitarian crisis. The proactive deployment of Army was instrumental in saving several precious lives, especially during the initial stages of the catastrophe. Probing patrols were launched immediately on the information of the cloudburst to ascertain the damage, besides simultaneously undertaking interaction with lower level officials in the State administration. The disaster response mechanism at the Army HQ was immediately activated as per the Standard Operating Procedures to continuously monitor the situation. As the extent of the damage was revealed in the days to follow, additional troops were built up to supplement the Army presence in Uttarakhand.

### **Indo-Tibetan Border Police (ITBP)**

ITBP being the sentinel of the Himalayas were deployed all along the border and had been the first responder during several natural and anthropogenic disasters since its inception. On receipt of weather alerts from IMD, directions were issued to Station Head Quarters (SHQ) and units under command to take appropriate steps for invoking State of alert. Units were advised to keep wireless communication on listening watch, report any eventuality and establish lookouts at all vulnerable points. All units were directed to be in readiness on disaster response. ITBP commenced its operations under the IG Northern Frontier in Uttarkashi/Dehradun axis on June 16, on Badrinath axis on June 17, on Kedarnath axis on June 18, and on Ghagaria – Hemkund axis on June 19 onwards. The ITBP deployed 1,600 personnel, 1000 from Garhwal region and 600 from Kumaon region.

### **Indian Air Force**

The unprecedented magnitude of destruction caused by the flash floods in Uttarakhand called for an immediate and large scale relief and rescue effort. IAF responded to this enormous challenge with characteristic speed, resolve and fortitude in the biggest ever Humanitarian Assistance and Disaster Relief Operation. The sheer scale of a rescue effort to save lives was compressed into a very tight timeframe whilst operating in difficult mountainous terrain and that too under some very hostile weather conditions. Both human and machine operated to their limits within the safety margins to execute all missions in record time.

The entire team, be it the courageous men and women who flew the helicopters in a difficult environment marred by frequent spells of bad weather or the transport crew, pitched in with all their resolve. The C-130 Hercules Transport Aircraft provided innovative solutions and was used as mobile weather platform as well as acted as an Airborne

Command Post. The Hercules was also used as an 'air bridge' to ferry fuel and rescued people between Dharasu and Delhi. Bridging equipment from distant locations were airlifted by An-32 aircraft to Jolly Grant to support the Border Road Organization (BRO) efforts.

### **National Disaster Response Force (NDRF)**

The National Disaster Response Force (NDRF) has been constituted for the purpose of specialist response to a threatening disaster situation or disaster. NDRF is the only dedicated disaster response force of the world. This is the only agency with comprehensive response capabilities having multi-disciplinary and multi-skilled, and high-tech trained personnel. Union Ministry of Home Affairs instructed NDRF to move to Uttarakhand on June 16-17, 2013. NDRF deployed 14 Battalions to affected sites. They carried out search and rescue operations in Kedarnath-Jungle Chatti, Gaurikund-Rambada-Bhairav Chatti, Guptkashi-Phata-Sonprayag-Gaurikund and Badrinath-Harshil/Sukhi top.

NDRF made a quick assessment of the situation in coordination with disaster management officials of Uttarakhand. They deployed and airlifted their equipments for rescue operations in Kedarnath area, moved to Rudraprayag and established a base camp for rescue and relief operations for the pilgrims/tourists.

During its 15 days operation from June 18 to July 19, NDRF personnel successfully rescued 9,044 people from different affected areas of Kedarnath (1053), Jungle Chatti (907), Gaurikund (756), Guptkashi (1281), Sonprayag (2000), Sukhi top (120), and Badrinath (2927). In addition to this, NDRF also rescued 14 foreigners from Singapore. The team provided medical aid to 881 pilgrims/tourists. NDRF helped in setting up helipad and dropping of stranded people in the Jungle Chatti area. A sum of total Rs. 1,16,32,573 foreign currency and many other valuable items retrieved from the unusual element.

In an unfortunate helicopter accident on June 25 in the Kedarnath valley, a team of rescuer comprising of NDRF along with IAF and ITBP personnel made the supreme sacrifice in the cause of the nation at 12.30 hrs while coming from Kedarnath. Of the 20 rescuers in the helicopter, nine personnel from NDRF were killed along the six personnel from ITBP and five personnel from IAF lost their lives.

### **Conclusions**

The State of Uttarakhand witnessed a severe disaster due to heavy rainfall, cloudbursts and landslides on 16-17 June, 2013. The Uttarakhand Disaster 2013 caused irreparable losses of precious lives and damage of private properties, public properties, infrastructures, and many others. To be brief, more than nine million people were affected by the flash floods. The five districts namely Bageshwar, Chamoli, Pithoragarh, Rudraprayag and Uttarkashi of Uttarakhand were worst affected by the natural disaster. A heavy loss of lives and

properties and the deluge had washed away many roads, bridge and buildings as well as other infrastructure. In the Himalayan region during the monsoon happening of heavy rainfall and rise of water level in the river and this type of incident continue in the Himalaya range. In Uttarakhand during this current monsoon happened heavy rainfall came before the time and created large scale disasters. All rivers created floods and damages the whole state. A lot of houses collapsed and flooded near to the river bank and many people lost their business, crops land, Government infrastructures, etc.

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