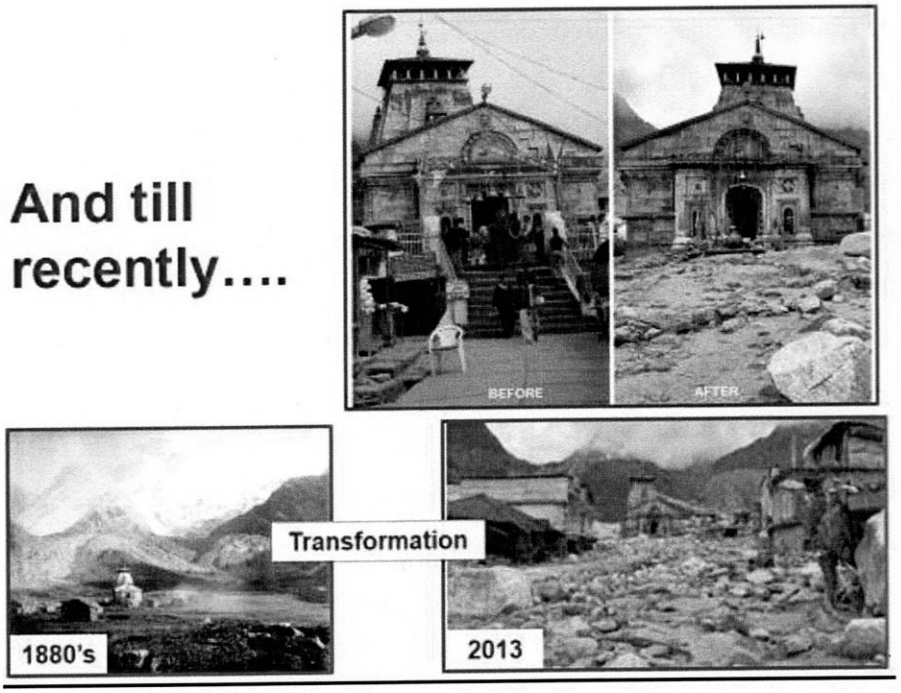
## CHAPTER IV – A CASE STUDY ON DISASTER RESPONSE IN UTTRAKHAND FLOODS: JUNE 2013




***'Be prepared'***

\- Boys Scouts Motto

4.1. Having discussed the disaster response mechanism in India and IRS, it is prudent to examine the need and efficacy of IRS in the backdrop of some recent disaster in the country. The state of Uttrakhand suffered major floods in the month of June 13 resulting in huge loss of lives and property. Consequently, the world saw a mammoth response & relief exercise, mounted to rescue the survivors and provide succour to victims of the tragedy. Uttrakhand disaster of June 2013, therefore was a recent and a fit case for study from disaster response and IRS institutionalisation point of view.

4.2 **Disaster Vulnerability & Disasters in Past**. The mountainous region of Uttarakhand is part of the Himalayas, which are among the youngest mountain ranges in the world. Consisting mostly of uplifted sedimentary & metamorphic rocks and tectonically very active, the region is extremely vulnerable to natural disasters. Due to its geo-climatic and socio-economic conditions, Uttarakhand is one of the most disaster prone states of the country. Natural hazards like earthquakes, landslides, avalanches, cloudbursts, hailstorms, glacial lake outburst floods (GLOFs), flash floods, lightning, and forest fires etc. have been a cause of major loss to the region and the society. Uttarakhand by virtue of its geographical setting is vulnerable to minor ecological changes. Hence any activity disapproved by mountain ecosystem triggers a disaster. In addition to natural phenomenon, various human activities have also been the major contributing factors towards the remarkable increase in the vulnerability of the region to hazards. These include unscientific development and land use pattern, poor socio-economic conditions, forest degradation and deforestation, increasing population and tourism pressure etc[78]. In the recent years (1990 onwards) Uttarakhand has experienced two major earthquakes (magnitude >6) in Uttarkashi (1991) and Chamoli (1999) and a series of landslides/cloud burst such as Malpa (1998), Okhimath (1998), Fata (2001), Gona (2001), Khet Gaon (2002) ,Budhakedar (2002), Bhatwar i(2002), Uttarkashi (2003), Amparav (2004), Lambagar (2004), Govindghat (2005), Agastyamuni (2005) Ramolsari (2005) and many more[79]. As per earthquake zonation map of India, the entire State can be divided into two zones, i.e. Zone V and Zone IV[80]. Flash Floods are also very common hydro-meteorological hazards in Uttrakhand due to excessive rainfall or snowmelt, bursting of dams, cloudburst, etc. Such floods are common due to the high velocity of water with much energetic capacity to carry away everything in its way[81]. The districts of Bageshwar, Chamoli,

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[78] 'Uttrakhand Disaster Report 2013' prepared by NIDM, pp 2.
[79] http://dmmc.uk.gov.in/pages/display/93-at-a-glance, Official Website of Disaster Mitigation and Management Centre (DMMC), Govt of Uttarakhand.
[80] DMMC Report, 2012,' State Disaster Management Action Plan for the State of Uttarakhand'. DMMC, Uttarakhand Secretariat, Rajpur Road, Dehradun. http://dmmc.uk.gov.in/files/pdf/complete_sdmap.pdf .
[81] 'Uttrakhand Disaster Report 2013', prepared by NIDM, pp 3..

Pithoragarh, Rudraprayag and Uttarkashi, which were most severally affected in the 2013 flash floods, also fall within the Seismic Zone V[82].

**Disaster Management Mechanism in the State**

4.3. Uttrakhand is the first state in the country which decided in 2001[83] to have an independent ministry and department of 'aapda prabandhaan' (disaster management). CAG Report No 5 released as recently as on 23 April 2013 said that *the SDMA, which was formed in October 2007, has never met till date. Nor has it made any "rules, regulations, policies or guidelines", a preliminary step for the authority to have any functional meaning*[84]. However, Disaster Mitigation and Management Centre (DMMC) at Dehradun has been working and doing the role of SDMA both in planning and execution of disaster management projects in the state[85]. It was also learnt that, efforts are on to revive SDMA consequent to the Kedarnath Floods in June 13. The state has DDMAs activated in all the districts under the district magistrates. The state has also begun the process of formation of SDRF after the tragedy struck in June 2013. Two SDRF battalions are under raising in the state[86]. The state has a state level EOC (SEOC) at Dehradun co-located with the main offices and manned by the manager and few personnel (personnel are on contractual basis). The districts also have DEOC, operational in all the districts[87]. The SEOC is functional but needs modernization, equipping and trained manpower to make it operational in real sense.

4.4. **Training in Disaster Response**. As learnt the state is very proactive in conduct of training. The state has a unique training programme conducted at

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[82] Govt of Uttarakhand, 2013.Uttarakhand Disaster Recovery Project (P146653) World Bank Assisted: Environmental and Social Management Framework, Draft, Sept 2013, pp 6.
[83] Dr Piyush Rautela, Executive Director, DMMC, Dehradun while interacting at DMMC, 28 Feb 14.
[84] Varma Subodh, Times of India, 'Uttarakhand disaster plan doesn't exist, CAG warned in April', 21 June 13, http://timesofindia.indiatimes.com/india/Uttarakhand-disaster-plan-doesnt-exist-CAG-warned-in-April/articleshow/20690268.cms , 07 Mar 14.
[85] Dr Piyush Rautela, Executive Director, DMMC, Dehradun while interacting at DMMC, 28 Feb 14.
[86] Maj Rahul Jugran, Manager State EOC under, DMMC, Dehradun, unstructured interview 28 Feb 14.
[87] Ibid.

panchayat level where community members in a group of about 25 are trained in SAR & first aid. The state has conducted over 300 such courses in past three years. The state also conducts table top exercises and mock drills. The state had organized a number of mock exercises in the months preceding the disaster in June 13[88]. As regards, IRS training, a few officials have taken training in IRS at NIDM in the state but the numbers are too few to be of any consequence.

**Uttrakhand Disaster June 13**

4.5. **Causes & Theories for the Disaster**. On June 16, 2013 the State of Uttrakhand suffered its worst disaster in the living memory with huge loss of lives and wide spread destruction. The State was hit by unprecedented heavy rainfall, possibly due to the fusion of *Westerlies* with the Indian Monsoonal cloud system. Prolonged and unprecedented heavy rainfall for five consecutive days during the period of June 14-18, 2013, over a large area, resulted into flash floods, and landslides at many locations, which eventually turned into the massive disaster. During these 5 days, the State received approximately 2000 mm of rainfall[89], which is more than what it receives throughout the monsoon season and hence capable of creating devastation as was seen in Uttarakhand. Though the prolonged torrential rainfall was the main cause of the disaster, there were probably some other factors too that increased the intensity of the disaster and turned it into a mega disaster. The combination of factors namely the early torrential rain, massive landslides, formation of temporary lake due to obstruction caused by landslides and moraine deposition and subsequently breach in the lake leading to sudden release of huge amount of water probably caused mass devastation in downstream areas. According to another theory[90], the torrential rain fall in the upper region triggered a massive landslide that hit Kedarnath area, and glacier lake (Chorabari) at higher altitude near Kedarnath area. The heavy rain also

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[88] JK Sinha, Member NDMA, while addressing participants of LSC Course at NIDM, Jan 14.
[89] TRMM, 2013. Tropical Rainfall Measuring Mission. Retrieved from http://trmm.gsfc.nasa.gov/
[90] GSI, 2013. Preliminary Study Note on Natural Disaster in Uttarakhand. http://www.portal.gsi.gov.in/gsiDoc/pub/note-natural-disaster-uttarakhand.pdf .

caused the melting of Chorabari Glacier at the height of 3895 m, and eruption of the Mandakini River, which led to heavy floods near Govindghat, Kedar Dome of Rudraprayag district, Uttarakhand. There is one more theory about the causes of disaster which states that following the heavy rainfall, the Chorabari glacier rapidly melted. Suddenly, millions of gallons of water accumulated in the moraine built Chorabari glacial lake (approx 400 m long, 200 m wide with a depth of 15–20 m and located about 2 km upstream of Kedarnath town) within three days ($15^{th}$ – $17^{th}$ June), which increased its potential energy and reduced the shear strength of the moraine dam. Eventually, the loose moraine dam breached, which caused a colossal destruction in the Kedarnath valley[91].

4.6. **Impact of Disaster**. The disaster coincided with the peak tourist and pilgrimage season significantly enhancing the number of the causalities with attendant adverse impact on the immediate rescue and relief operations. The impact was further amplified by other cumulative effects of local geological, meteorological, environmental and anthropogenic factors. The destruction though spreading over the State, the largest impact occurred at the Kedarnath shrine and its vicinity, primarily due to a large influx of seasonal pilgrims/tourists. The districts of Bageshwar, Chamoli, Pithoragarh, Rudraprayag and Uttarkashi were the worst affected. Large population in several areas were cut off across the State and suffered due to shortage of essential commodities. The nature's fury manifesting into unprecedented damage and destruction was most pronounced in the Mandakini valley of the Rudraprayag district. Torrential rains coupled with melting of the Chorabari Glacier led to flooding at the Kedarnath Shrine and the adjacent areas of Rambara, Agostyamuni, Tilwara, and Guptkashi. Other pilgrimage centres in the region, including Gangotri, Yamunotri, and Badrinath, which are visited by thousands of during the summer season, were also affected. People in important locations such as the Harsil, Valley of Flowers, Roopkund and Sikh

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[91] DP Dobhal., AK Gupta, Manish Mehta, and DD Khandelwal, 'Kedarnath disaster: Facts and Plausible causes'. Scientific Correspondence, Current Science, Volume 105, No. 2, 25 July, 2013. http://www.currentscience.ac.in/Volumes/105/02/0171.pdf

Pilgrimage Centre Hemkund Sahib were stranded for days together. Over one lakh people were stuck in various regions of the State due to roads, landslides and flash flood induced debris.

4.7. **Losses in the Disaster**. More than nine million people were affected by the flash floods. Five districts namely Bageshwar, Chamoli, Pithoragarh, Rudraprayag and Uttarkashi were worst affected. A total of 680 people died and over 4117 people were reported missing[92] (presumed to be dead). About 1,603 villages were affected, 8,586 cattle/livestock were lost and 1,931 houses were fully damaged[93]. This also left over 70,000 tourists and 100,000 local inhabitants stranded in the difficult treacherous mountain terrain of upper reaches of the Himalayas[94]. It is also noteworthy that due to large presence of tourists and pilgrims, most of the fatalities were from other states. While the main cause of casualties was sudden flash flood which caught the ill-fated people unaware, the harsh weather conditions i.e. continuous rainfall, chilling cold and non-availability of proper shelters/clothes were also to some extent responsible for large number of casualties. There was extensive damage to housing, both in urban and rural areas, as settlements were mostly concentrated along rivers over the time, due to increase in influx of pilgrims/tourists. The unprecedented floods with heavy sediments caused intense erosion of the river banks that washed away large sections of roads and a significant number of bridges at many places. The disaster caused damages to all major roads, number of motor and bridle bridges. Road connectivity to thousands of villages in the State was lost and the areas remained disconnected and isolated. A large number of vehicles were washed away, buried under debris, fell off the hills, or were stranded at cut-off locations. Without being critical of the preparedness and response at the State level, it needs to be

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[92] MHA, Report, 2013. A note on the 'recent devastation in Uttarakhand and Govt measures to tackle this natural disaster in Uttarakhand', October, 2013.
[93] Ibid.
[94] JRDNA Report, 2013. India - Uttarakhand Disaster, June 2013 (82643). Joint Rapid Damage and Needs Assessment Report. Jointly submitted by Govt. of Uttarakhand, ADB and the World Bank, August, 2013.

acknowledged that significantly useful lessons have come out in all aspects of disaster management, meriting attention at highest levels.

4.8. **Response to the Tragedy**. By its sheer magnitude and intensity the disaster took the State administration and the Central Govt by surprise. The administration launched a huge rescue and relief operation immediately with the assistance of the Centre, accomplishing one of the biggest rescue and relief operations, evacuating more than one lakh persons to safe places[95]. The state Govt, with the assistance of the emergency response agencies Army, Air Force, ITBP and the NDRF, carried out emergency relief and evacuation operations in the aftermath of the disaster. Notwithstanding the heavy rains that delayed and complicated the operations, the IAF, the Indian Army, the Paramilitary troops, civilian helicopters put in commendable efforts towards immediate rescue and relief operations. The Army, the IAF, Para Military Forces and NDRF worked to the hilt to bring succour to the suffering population.

4.9. **Chronology of Events in June - July 2013**.

(a) **14th June**. Indian Meteorological Department (IMD) had released a warning of heavy rainfall during next 48 hours[96], anticipating an emergency situation. The Hon'ble Chief Minister of Uttarakhand, Shri Vijay Bahuguna had issued directions to all District Magistrates to manage the emergency situation in case of a disaster due to possible heavy rainfall[97].

(b) **15th June**. IMD (Dehradun), Regional Weather Forecasting Centre (RWFC), New Delhi and National Weather Forecasting Centre (NWFC), New Delhi had issued a warning of very heavy rainfall during the next 48 to 72 hours. Besides, in the morning of same day, Meteorological Centre at

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[95] 'Uttrakhand Disaster Report 2013,'Prepared by NIDM, pp 3.
[96] Govt. of India, Ministry of Earth Science, IMD, 2013. A preliminary report on heavy rainfall over Uttarakhand during 16-18 June 2013. Indian Meteorological Department, New Delhi, July 2013.
[97] Press Release, Govt. of Uttarakhand, 14 June 2013. http://www.cm.uk.gov.in/pressrelease .

Dehradun issued an advisory to postpone the Char Dham Yatra by four days. On behalf of IMD, this note was issued on 15th June to the District Magistrate, of Rudraprayag and ITBP, requesting them to shift yatris to safer places[98]. The region received continuous heavy rainfall of 325 mm during June 15 and 16.

(c) **16 June**. IMD repeated its warning of heavy to very heavy rainfall at few places during next 36 to 48 hours. The Char Dham Yatra weather forecast issued in the morning of June 16 advised postponement of the yatra by three days. Advisory note was issued to the Chief Secretary of Uttarakhand; the Executive Director, Disaster Management; District Magistrates of respective districts and ITBP advising people to move to safer places and not to venture into hills. Army took a proactive approach and was in touch with authorities at the state and district level from June 16 onwards. In the meantime the MHA instructed one Battalion (12 Teams) of NDRF to move to Uttarakhand on June 16/17th.

(d) **17 June**. Another warning of isolated heavy to very heavy rainfall during the next 24 to 48 hours was issued. At around 6:55 AM, a huge sound and water rushing from the Chorabari (3960m) side was reported through a wireless message. At that time about 500 to 700 people were present at Kedarnath temple. Approximately, 3000 cumecs of water released within 5 to 10 minute time. Boulders rolled down and the height of water column rose to 12 feet and heavy rains continued till 5 PM. Search and rescue operation were launched by the local police at 5:30 PM[99]. By this time the State Govt set up was on full alert. The Army columns were on standby across the State. The reconnaissance columns of the Army unit located at

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[98] Govt. of India, Ministry of Earth Science, IMD, 2013. A preliminary report on heavy rainfall over Uttarakhand during 16-18 June 2013. Indian Meteorological Department, New Delhi, July 2013.

[99] Sinha, Amit; DIG, Garhwal Division, Uttarakhand, 2013. "Uttarakhand disaster – Coordination and Administrative issues", presented in the National workshop on "Uttarakhand Disaster 2013: Lessons Learnt", 19 August 2013, organized by NIDM.

Rudraprayag could not move beyond Rudraprayag as the River Alaknanda was flowing above danger mark close to the bridge on the Rudraprayag-Kedarnath axis. The NDRF teams of 8th and 7th battalion reached Haridwar and Dehradun, respectively. Consequent to emergency meetings Chaired by the CM of Uttarakhand seeking emergency assistance from the Central Govt, the Air Force deployed eight helicopters at Dehradun. But due to the bad weather conditions, operations remained suspended for quite some time. All available resources of the State Govt were also alerted and immediately deployed for relief and rescue work.

(e) **18 June**. By June 18, 2013 rescue and relief operations were in full swing with the help sought from the Army, Air Force, NDRF, ITBP, Border Road Organization (BRO), and Border Security Force (BSF). Helicopters were deployed extensively for SAR operations with Air Force having commenced rescue operation in the Kedarnath sector in the morning itself. The Army Advanced Landing Ground (ALG) at Gaucher was converted by the Army into a major aviation base for civil, Army and IAF helicopters. The location was developed into the main administrative base as the relief operations progressed over the following days.

(f) **19 June**. By this time more than 10,000 people were reported to have been rescued, and provided food, clothing and shelter. It was now evident that the maximum damage was in the Kedarnath and its vicinity. The Army rescue and relief efforts continued on Badrinath axis too. Small Mountain Rescue Teams (MRT) were dropped by helicopters at Ghastoli, Ghagharia, Hanuman Chatti and Lambagarh to assist pilgrims in crossing difficult areas. Army unit located at Narendranagar had opened the route up to Dharasu in the Harsil sector. The unit located at the Harsil sent out columns along Gangotri and Uttarkashi axes which were blocked at Dharali and Sukhi respectively and rescued stranded pilgrims evacuating them to the Army location at Harsil.

(g) **20 June**. The road to Gangotri was opened and all stranded vehicles at Gangotri were brought to Harsil. Approximately 7000 civilians along with 1000 to 1500 vehicles were rescued in the Harsil sector. Six information hubs were also established by HQ Artillery Brigade for civilians, three each at Rishikesh and Haridwar. The road to Rishikesh – Joshimath was also opened up to Govindghat by June 20 facilitating move of pilgrims by road to safety on Badrinath axis.

(h) **21 June**. Till now approximately 556 people, including tourists and pilgrims reportedly succumbed in the flash floods and landslides mishap. However, the number of casualties were expected to be much higher. As per locals and those involved in rescue operations, many thousands of people still remained unaccounted for. More than 32,000 people were still stranded. As per survivors, most of the pilgrims had died because of hunger and dehydration[100]. The military and para-military forces, assisted by local administration continued with their operations in a relentless manner.

(j) **22 June**. Army paratroopers were inducted into the Kedarnath valley and assigned the task to prepare suitable landing areas for helicopters along the axes Sonprayag-Gaurikund, Gaurikund-Jungle Chatti and between Jungle Chatti and Rambara, as a large number of pilgrims were stranded en route. With no foot bridge/mule track existing, the pilgrims were stranded in these areas for more than 5 to 6 days without sufficient food and shelter, under inhospitable weather conditions. Rescue operations by Army as well as civil helicopters commenced soon thereafter. People were rescued from makeshift helipads to safer places along the Sonprayag- Guptakashi road. SAR operations were further stepped up by the IAF due to indications of bad weather after next 48 hours. The IAF had by now deployed 37

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[100] Anonymous, 2013. "Till now 556; after rain, hunger begins to kill. Uttarakhand Horror, Survivor says he saw a thousand corpses", E-news, Hindustan Times, 22 June 2013. http://paper.hindustantimes.com/epaper/viewer.aspx#

helicopters (23 MLH, 11 ALH and 02 Cheetah aircrafts) into search, rescue and relief operations[101]. By the end of June 21 BRO had successfully opened Rishikesh-Joshimath-Mana road up to Govindghat stretch and the Rishikesh - Dharashu road.

In the Badrinath area, the Army rescue teams could reach Lambagarh on established a Burma bridge across the water channel enabling those fit to walk to cross over and walk down to safety to Joshimath. The Army aviation helicopters were used to establish a helicopter bridge at Govindghat which fast tracked evacuation operation to Joshimath significantly evacuating over 1000 pilgrims in a single day.

(k) **23 June**. Massive rescue and relief operations continued in the region. As per the media reports till now various agencies, including the Indian Army, Indian Air Force, ITBP, and NDRF had rescued about 80,000 stranded people and shifted them to safer places[102]. The delay in initiating relief and rescue measures were due to difficult terrain, bad weather conditions, and lack of road connectivity in the inaccessible area[103].

(l) **24 June**. By this day all civilians stranded in Jungle Chatti in Kedarnath area had been evacuated by helicopters. At the same time, more than 8,000 people were still stuck and stranded across the state and about another 5,000 people were yet to be evacuated from the area of Badrinath. UAVs (Unmanned Aerial Vehicles) were deployed to scan the whole area of Kedarnath, mainly to identify the possible presence of survivors in the inaccessible areas. Nearly fifty UAV sorties were carried out, helping

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[101] Nair, S. R. K., Air Vice Marshal, AVSM VM, IAF, 2013. "Uttarakhand Disaster Response – Operation Rahat, June – July 2013", presented in the National Workshop on "Uttarakhand Disaster 2013: Lessons Learnt", 19 August 2013, organized by NIDM, New Delhi.

[102] Anonymous, 2013. "Rain hits rescue, thousand stuck", E-news, Hindustan Times, 24 June 2013. http://paper.hindustantimes.com/epaper/viewer.aspx#.

[103] Anonymous, 2013. "NDMA ramps up efforts, says govt caught off-guard", E-news, Hindustan Times, 24 June 2013. http://paper.hindustantimes.com/epaper/viewer.aspx# .

rescuers locate stranded people in forests, hills, and other isolated areas far away from Badrinath and Kedarnath[104].

(m) **25 June**. An IAF helicopter (Russian-built Mi-17 V5) crashed near Gaurikund due to bad weather, while dropping loads in the area. The chopper went down North of Gaurikund, at around 12.30 PM. All the 20 rescuers (09 from NDRF, 06 from ITBP and 05 from IAF), perished in the mishap. On the same day, a team of "GARUD" (IAF commandos) was deployed in the area which recovered the mortal remains of the personnel killed during rescue and relief operations in the ill-fated aircraft.

(n) **26 June**. The situation remained grim [redacted], notwithstanding the immense rescue and relief operations. As per the media reports, more than 2,000 villages in Uttarkashi, Chamoli and Rudraprayag districts were either completely or partially affected. At least 2000 people were reported missing from Rudraprayag district. Unidentified bodies were strewn across the state, and a huge pile of decaying bodies was lying in Kedarnath temple[105]. The State administration commenced mass cremations in the Kedar valley. One Engineering unit from the Army was inducted which improved the track from Maneri to Bhatwari in the Harsil sector. The Army engineers also launched an aluminium foot bridge across Alaknanda river to facilitate speedy evacuation on the Badrinath axis.

(o) **27 June**. Evacuation of pilgrims from the Badrinath by air continued for old, sick, women and children, while those found physically fit were motivated to walk down to Govindghat. As on this day, more than 3,000 people were stranded and about 3,000 people remained missing in Uttarakhand. Nearly 1.04 lakh people were evacuated by various agencies.

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[104] Anonymous, 2013. "Drones in rescue act", E-news, Hindustan Times, 25 June 2013. http://paper.hindustantimes.com/epaper/viewer.aspx#

[105] Anonymous, 2013."Govt braces for DNA profiling as hope fades for the missing", E-news, Hindustan Times, 26 June 2013. http://paper.hindustantimes.com/epaper/viewer. Aspx

All major roads except Joshimath – Badrinath, Rudraprayag – Gaurikund and Uttarkashi – Gangotri were opened by this day[106].

(p) **28 June**. By this day, all pilgrims stranded at Gangotri in Uttarkashi area had been evacuated, leaving behind only the locals. A team of Marine Commandos also carried out aerial reconnaissance of the Kedarnath area to ascertain if there were any survivors on the Kedarnath axis. Air evacuation continued from Guptkashi to Dehradun. An alternate axis from Guptkashi to Tehri and onwards to Rishikesh was opened for evacuation of pilgrims. In total approximately 5768 pilgrims were evacuated from the Kedarnath Axis[107].

(q) **01 July onwards**. The District Magistrate of Uttarkashi derequisitioned the Army columns deployed in the district on 1st July. Operation Rahat of the IAF was called off on July 3[108]. However, civil helicopters continued to provide rations and relief material till July 10. The Indian army carried out 1,820 sorties from army aviation, rescued 15,113 people, and supplied relief material of 2.8 lakh Kg. As per the official report of the State Govt, about 1,10,000 pilgrims and tourists were evacuated despite inhospitable terrain and hostile weather conditions. IAF carried out about 2,616 sorties and evacuated around 21,961 persons. 2,000 sorties were undertaken by civilian helicopters hired by the State Govt to evacuate the stranded persons. 12,000 persons were thus evacuated by civilian choppers. More than 5,000 vehicles were arranged by the State Govt and approximately 90,000 persons were evacuated by road. The State Govt had made all

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[106] Anonymous, 2013. "Govt faces uphill road to recovery", THE TWENTY-DAY OPERATION RAHAT", E-news, Hindustan Times, 28 June 2013. http://paper.hindustantimes.com/epaper/viewer.aspx# .

[107] Operation Sahayata - Final Report, 2013. Indian Army Headquarters.

[108] Anonymous, 2013. "Uttarakhand air rescue operations called off in a hurry?", NDTV news, 3 July 2013. http://www.ndtv.com/video/player/news/uttarakhand-air-rescueoperations- called-off-in-a-hurry/281698.

arrangements and ensured that the evacuated persons reached their respective destinations safely[109].

4.10. **Role and Initiatives in Rescue & Relief Operations**. Search, rescue and relief operations during Uttarakhand disaster were the most difficult operations carried out in the India's recent history of disaster management. Various Central and State level Govt and even non-Govt agencies played significant role in making this operation successful despite remarkable odd situations like difficult terrain, adverse weather conditions, disrupted roads and other connectivity.

(a) **Central Govt**. MHA, provided all the necessary support in managing the Uttarakhand Disaster in more effective and efficient manner. NDRF were instructed to send their teams to Uttarakhand on 16 June itself. Home Secretary held meetings of senior officers of NDRF, ITBP, BRO, Ministry of Defence (MoD) and other ministries on June 17-19 to make on the spot review of rescue and relief operations. NEC meetings reviewed the status of ongoing rescue and relief operations on July 1, 3, 8 and 10. In addition, NCMC also took review of the situation in the State on day-to-day basis. Central Govt nominated Shri V. K. Duggal, Member of NDMA, as the nodal officer to coordinate relief and rescue operations in Uttarakhand, which further facilitated coordination among various Central and State Govt agencies engaged in rescue operations[110]. The Govt had deployed 14 teams of NDRF, 1200 ITBP personnel and 8000 Army personnel, to conduct 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 GoI provided necessary support in the form of deployment of 45 helicopters of IAF and 12 helicopters of the Army. The State Govt also used a number of civil aircrafts for evacuating the stranded people. To restore the

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[109] Govt. of Uttarakhand, 2013. "Disaster Relief Memorandum for Central Assistance, Department of Disaster Management", Govt. of Uttarakhand.

[110] Anonymous, 2013. "Ex-home secretary made nodal office for rescue ops", E-news, Hindustan Times, 22 June 2013.http://paper.hindustantimes.com/epaper/viewer.aspx# .

communication, 105 satellite phones were distributed by the GoI to various Central and State agencies in order to facilitate communication.

(b) **State Govt of Uttrakhand**[111]. Soon after the disaster, the State Govt initiated massive rescue and evacuation operations with the help of various GoI and State Govt agencies to include Army, Paramilitary Forces, NDRF, etc. During the initial stages, advisories were sent to all the concerned districts and announcements were made by police personnel stationed at Kedarnath, Rambada and Gaurikund alerting the general public. The State administration stopped further movement of pilgrims from Rishikesh to higher areas. State Govt requisitioned the services of the Army, IAF and Central Paramilitary forces (ITBP, NDRF) 16 June itself. A coordination committee under the CS was formed in which Govt 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 Govt of India agencies and the State Govt. Other State Govt agencies such as the Police Department, District Authorities, NGOs and volunteers also helped in these operations. 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 were run where 1,51,629 pilgrims/local residents were looked after. Some camps continued operating beyond the emergencies phase for the local residents. Approx 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 at 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. The State Govt established a Missing Persons Cell on 27 June at

[111] 'Report on Uttrakhand Disaster, by NIDM, 2013'.

Disaster Mitigation and Management Centre (DMMC) at Dehradun. The missing persons' data was managed with the support of IBM professionals. A thorough combing operation was carried out with the help of the Army, ITBP, NDRF and local police to locate any missing person or dead bodies, particularly in the Kedarnath – Gaurikund sectors.

(c) **Summary of Response**[112].

(i) NDRF deployed 14 teams for the operation and rescued more than 9,044 persons.

(ii) ITBP had deployed about 1,600 personnel for the operation and rescued more than 33,000 persons.

(iii) IAF had deployed about 45 helicopters for the operation and rescued more than 23,500 persons.

(iv) Indian Army had deployed 8,000 personnel including 150 Special Forces and rescued more than 38,500 persons. 12 army Helicopters were deployed.

(v) 20 civil aircrafts were utilized by the State Government in the operations and evacuated approximately 12,000 persons.

(vi) Nehru Institute of Mountaineering, Uttarkashi, formed 5 rescue teams of 20 instructors and local youth, and they evacuated more than 6500 stranded persons.

(vii) More than 1,35,000 persons were evacuated from the affected areas in the shortest possible time, notwithstanding

[112] 'Report on Uttrakhand Disaster', Prepared by NIDM, 2013.

widespread destruction of roads, difficult terrain and extremely hostile weather.

(viii) There may be overlapping in number of persons rescued by agencies mentioned above, as the same person could have been rescued by different agencies through road, bridge and air before reaching final destination.

**Shortcomings in Response & Lessons Learnt**

4.11. Shri Bhaskarnand who was in the thick of managing the disaster from the state govt side acknowledges that the rescue & relief operations were conducted in the best possible manner given the adversity of prevailing weather conditions and inhospitable terrain in affected areas[113] though there are a number of lessons learnt from the operations. Similarly, while interacting with the experts at NIDM, it was brought out that the response to the disaster was as good as it could be at state level and undoubtedly all the agencies did their best. It is at the functional level (district / Block/ Taluka) that the preparedness /response was found lacking[114]. However, in private a number of responders who took part in the relief operations admit that the response could have much better with better preparedness levels and coordination. Also as per media reports "*The state authorities were virtually non-functional, referring to the disaster management system, which by definition and law, includes both preparedness as well as response to disasters. The state disaster management plan was under preparation and actionable programmes were not prepared for various disasters," the report says*[115]. Shortcomings and a few lessons drawn from the case only from the point of view of preparedness and response have been covered in succeeding paras.

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[113] Bhaskaranand, IAS, Secretary Disaster Management Uttrakhand Govt, in an unstructured interview at Dehradun, 28 Mar 14.

[114] Dr Satendra, Executive Director NIDM, in an unstructured interview at NIDM, 25 Feb 14.

[115] Subodh Varma, Times of India, 'Uttarakhand disaster plan doesn't exist, CAG warned in April', 21 June 13, http://timesofindia.indiatimes.com/india/Uttarakhand-disaster-plan-doesnt-exist-CAG-warned-in-April/articleshow/20690268.cms , 07 Mar 14.

4.12. **State / District Disaster Management Plans**. At the most fundamental level, why things went wrong is that key decision-makers at many levels were not familiar with the disaster management plans. On interaction by NIDM team in the state, it was revealed that though disaster management plans were in existence, most of the officials were not well aware of the contents, their duties and responsibilities. The plans were also not updated since long at some of the places. State/District departments and agencies were required to develop supporting operational plans and SOPs to integrate their activities into the state level disaster preparedness. In almost all cases, integrating SOPs were either non-existent or still under development when Uttarakhand was hit by the flash floods. Consequently, the specific procedures and processes of the Disaster Management Plan were not properly implemented. This lack of understanding of the "Disaster Management Plan" resulted in ineffective coordination of the State, District and local preparedness and response[116]. In absence of SOPs / disaster response plans, more often than not the *civil functionaries were reportedly reacting to the situations*[117]. The State government needs to work with its ESF and DMMC/SDMA in revising existing plans, ensuring a functional operational structure and establishing a clear, accountable process for all State level disaster preparedness efforts. In doing so, the State government must ensure that ESF at state level viz. SDRF/Police/Civil defence & home-guards are organized, trained, and equipped to perform their response roles. Disaster management plans of state and districts must be made keeping in view the role and capacity of likely responders in disasters. To this effect, Army being a major responder in the state must be incorporated while preparing plans although the same is yet to be done at district level. Not only that, the district disaster response plans must also be shared with all the responders esp the Armed Forces[118].

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[116] 'Report on Uttrakhand Disaster', Prepared by NIDM, 2013.
[117] Col Rajeev Mehta, Unit Commander from Army at Rudraprayag, in a tele interview, 04 Mar 14.
[118] Ibid..

4.13. **Early Warning / Weather Forecast**. IMD had given early warning of heavy downpour but the same possibly neither interpreted correctly nor disseminated down to the functional levels. The forecast details were not disseminated to the state EOC and / or concerned departments[119]. 15 & 16 June being Saturday and Sunday possibly added to the delays in reactions by the local machinery. Additionally, the weather forecast & early warning was not so specific and hence, it was being taken as a routine warning. With better equipment availability and technology, weather forecasts must become more specific in terms of degree of severity, location and time. The forecast terms / language should be simplified so that those affected are able to interpret and comprehend likely impact in their areas of responsibility. Disaster warnings must trickle down to functional levels by the fastest means.

4.14. **Information Vacuum,** Interactions during the field visit to Haridwar and Dehradun on 27-28 Feb 14, it was revealed that the State and District administration were overwhelmed by the sheer enormity of the disaster. The complexity got compounded owing to an information vacuum that had got created in the initial few days of the response phase. There was lack of clarity and confusion in the initial 3-4 days in conduct of relief operations[120].

4.15. **Command & Control**. Although as per the ADM Rudraprayag District centrality of control & command should remain with District Magistrate to avoid any multiplicity of relief services in a particular area[121] command and control was a major grey area in this disaster response especially amongst the central agencies. On many occasions the support needed by relief agencies such as Army, Air Force, ITBP and NDRF amongst themselves was not forthcoming. The same became more pronounced in absence of any civil administrative representatives

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[119] Shivaji Singh, Senior Consultant NDMA & Ghosh Gautam , DM I, MHA (interactions at NDMA & MHA) in Feb 14.

[120] Col JS Rawat, GS Branch, HQ Uttrakhand Sub Area, Dehradun, recalling experiences in an interaction at Dehradun, 28 Feb 14.

[121] Navneet Pandey, ADM, Rudra Prayag district, Proceedings of the National Workshop on Uttarakhand Disaster 2013: Lessons Learnt, at NIDM, 19 August 2013.

at least in the initial stages. In fact this disaster was a fit case for instituting Unified Command structure propagated in IRS to bring all agencies under one umbrella and ensure synergy in operations. It is also very essential that in a multi-agency response environment, the chain of command and control is specified and adhered to avoid conflicts & contradictory passage of orders.

4.16. **Coordination**. Coordination of response was a major grey area in Uttrakhand response[122]. There were reports of lack of understanding and command & control with regards to deployment and coordination of the central resources. Col Rawat[123] recalled during an interaction '*there was a major disconnect and lack of coordination amongst the aviation resources deployed by the Air Force, Army Aviation and Civil Aviation*'. It was brought out in field interactions that inter-departmental coordination was a critical weakness in mobilising resources and organising response[124]. As per Mr Pawar, while the coordination at various levels was much better al relief stage, it was a weak area in the initial stages of SAR. Field level interactions with NDRF commanders, Army officers and few NGOs involved in response highlighted that at the initial stages, the coordination was not institutionalised but was being done more on personal rapport. Col Mehta brought out that most of the relief agencies were own their own resulting in chaos and confusion[125].Despite very sincere efforts by our rescue teams, number of shortcomings emerged in the rescue operations, which need to be taken care in our future strategy for handling such mega disasters. The overall SAR effort demonstrated the need for greater coordination among different rescue teams i.e. Indian Army, Air force, NDRF, ITBP , private aviation agencies etc., who because of their very different training and working environment have different procedures and methodologies to handle disaster situation. During the rescue

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[122] Shivaji Singh, Senior Consultant NDMA & Ghosh Gautam , DM I, MHA (interactions at NDMA & MHA) in Feb 14.
[123] Col JS Rawat, GS Branch, HQ Uttrakhand Sub Area, Dehradun, recalling experiences in an interaction at Dehradun, 28 Feb 14.
[124] Praveen Pawar, UN Disaster Management Team at Rudraprayag, in a tele-interview, 28 Feb 2014.
[125] Col Rajeev Mehta, Unit Commander from Army at Rudraprayag, in a tele interview, 04 Mar 14.

operation, many of the courageous lifesavers were put at unnecessary risk by a structure that failed to support them effectively[126].

4.17. **Civil Administration Void**. While thousands of pilgrims were stranded in many places there were hardly any presence of civil administration, even if they were there they were in small numbers to handle the situations. This void to an extent was being filled by the people in uniform ie Army, ITBP, NDRF or the Air Force as well as by some volunteer organisation. Col Rawat[127] recalled that there was no presence of civil administration at Gauchar, a relief hub created for rescue and relief operations. The police being revenue based also were not able to ensure law and order. It is therefore very important that the state government ensure that civil officials report on duty in the affected districts without loss of time. The government must make this condition binding in cases of emergencies and disasters.

4.18 **Leadership and Motivation**. Response operations of the kind in Uttrakhand were a very high paced operations necessitating a high degree of leadership and motivation levels. There were reports that a few senior civil functionaries reached Guptkashi and tried to coordinate the response effort. There are also reports of a few district functionaries not motivated to walk extra mile, much needed in emergency situations[128]. The response operations were required to be led from the front and hence the leadership vacuum was filled by the central agencies like Armed Forces, ITBP and NDRF who had their boots on ground[129].

4.19. **Leveraging on Built Capacity**. Uttrakhand has in past suffered numerous disasters in past. Hence, the state has been quite proactive in capacity building in

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[126] 'Report on Uttrakhand Disaster' Prepared by NIDM, 2013, pp 110.
[127] Col JS Rawat, GS Branch, HQ Uttrakhand Sub Area, Dehradun, recalling experiences in an interaction at Dehradun, 28 Feb 14.
[128] Col Rajeev Mehta, Unit Commander from Army at Rudraprayag, in a tele interview, 04 Mar 14.
[129] Ibid.

this regards. In spite of that the state could not leverage on the build capacity to optimal levels. The state had the following:-

(a) Separate department to manage disasters in the state headed by a minister and state disaster management authority.

(b) **SEOC**. Uttrakhand has an excellent EOC at Dehra Dun but the same was used more as telecommunication facility[130]. EOC is not only a communication hub but a command and control centre where the situation is monitored from minute to minute by officials from lead agencies as well as ESF agencies. EOC is meant to facilitate quick decision making, dissemination of instructions and monitoring. The decision makers have to be present at EOC in times of crises so that delays can be cut down. The decisions can be made only if required inputs are available in time. This can be ensured if an EOC is manned by the liaison officers (LOs) from various line departments and various responding agencies including from NDRF, Army, Air Force. It was learnt that state EOC was not manned by LOs from all the line departments and responding agencies in the aftermath of the disaster[131].

(c) Over 400 officials had been trained in disaster management in the state. There is a need to ensure that trained officials add value and strengthen the response system in the state. Their expertise must be leveraged and trained officials are placed in key positions.

4.20. **Response Priority.** In view of ever unavoidable paucity of resources, it is very important to prioritise allocation of resources and efforts. Information void and communications further complicate this issue. The same can only be overcome if

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[130] Shivaji Singh, Senior Consultant NDMA & Ghosh Gautam , DM I, MHA (interactions at NDMA & MHA) in Feb 14.

[131] Maj Rahul Jugran, Manager State EOC, DMMC, Dehradun, in an unstructured interview, 28 Feb 14.

the available resources have been mapped and a system is created to take stock of incoming and outgoing resources to have a live status of all available resources location / area-wise.

4.21. **Role & Task Allocation**. There were instances when a very specially trained force like NDRF was seen carrying out run of the mill jobs like escorting / helping people emplane / deplane etc, underutilising a force specially trained in search & rescue operations.. It is important that the expertise of responders must be exploited to the hilt and right people must be deployed on the right job.

4.22. **Air Operations by Agencies**. It was observed that there were instances when the responding agencies were operating in isolation. A case in point was air evacuation sorties being flown by Air Force, Army, State and private operators. There were cases where some states were allowing evacuation of victims belonging to only their respective states. The entire air effort not only has to be synergised to optimal levels, ill-coordinated flying operations may result in air accidents and add to miseries of both responders and disaster victims.

4.23. **Disaster Relief Stores**. As reported in media and by responding agencies there was a gross shortage of relief material in the initial stages impeding relief process. Therefore the state govt must identify disaster prone areas and locate relief material in certain pre-selected hubs for ease of response by state and central agencies in times of need. Due to lack of coordination and control on the situation, there were reports of relief material being distributed by the NGOs only in certain easily accessible areas. With the result while many deserving victims were marooned and not attended to, many others along the road horded the relief material eg many households collected 5-6 pressure cookers & blankets, etc[132].

4.24. **Resources Utilisation**. The civil administration was initially overwhelmed by the sheer magnitude of the destruction and took a few days before the Disaster

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[132] Col Rajeev Mehta, Unit Commander from Army at Rudraprayag, in a tele interview, 04 Mar 14.

Management Department of the state could get its act together. A large amount of relief material / resources got inducted but the state govt was unable to deploy these resources in a coordinated manner[133]. There were reports of adhocism in resource utilisation by the agencies along the axes they were deployed for rescue and relief operations. Individual agencies were utilising resources as per their own requirement and availability, with little or no coordination. A single agency either at district level or area-wise should be nominated / made responsible and all the resources should be placed under its control for allocation, judiciously. Resource update must be carried out from time to time to ensure critical items do not run out of stock, resources are not wasted and space utilisation is optimised.

4.25. **Mob / Crowd Management**. Crowd / mob management is a major exercise in such types of disasters. There were instances where there were no one to manage the crowd and helicopter pilots retuned without picking up any victims for fear of being mobbed by those crowding the makeshift helipads[134]. Maintenance of law and order also assumes importance where victims are in large numbers and situation can be exploited by the opportunists / anti-social elements.

4.26. **World Bank Assistance for Capacity Building and Disaster Response.** In view of numerous shortcomings and need for capacity building the World Bank has come to the aid of the state and sanctioned a financial package for the state of Uttrakhand[135]. As part of **Component 3** of the package technical assistance and Capacity Building for Disaster Risk Management worth US $ 38 m is being given with the objective to enhance the capabilities of government entities & others in risk mitigation and response. The breakdown is as follows:-

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[133] Col Rajeev Mehta, Unit Commander from Army at Rudraprayag, in a tele interview, 04 Mar 14.
[134] Praveen Pawar, UN Disaster Management Team at Rudraprayag, in an unstructured interview, 28 Feb 2014.
[135] Brig Naveen Airy, Group Presentations by participants of APPPA 39 on Disaster Risk Reduction, at IIPA, 25 Feb 14.

(a) **Subcomponent 3.1**: Risk Assessment, Modelling and Capacity Enhancement of Uttarakhand Space Applications Centre (USAC) - US$ 10 million.

(b) **Subcomponent 3.2**: Establishment of a Decision Support System (DSS) - US$ 3 million: This will entail setting up a DSS that will integrate, analyze information from multiple sources in a geo-spatial integrated system.

(c) **Subcomponent 3.3**: River Morphology Study - US$ 3 million.

(d) **Subcomponent 3.4**: Slope Stabilization Study - US$ 4 million.

(e) **Subcomponent 3.5**: Strengthening of the Uttarakhand State Disaster Management Authority (USDMA) - US$ 5 million-entails developing the institutional set up of the USDMA, technical enhancement of the facilities at the DMMC, training, regular drills for emergency operations centres and Disaster Management Officers at the District and State levels.

(f) **Subcomponent 3.6**: Strengthening Hydro-meteorological network and Early Warning Systems (EWS) - US$ 10 million.

(g) **Subcomponent 3.7**: Strengthening Emergency Response Capacity - US$ 3 million:- will focus on strengthening the capacity of the State's disaster response force, fire services personnel and other immediate key response agencies in responding adequately to disaster situations through better search and rescue equipment and enhanced training.

4.27. **Need for a Response System**. Uttrakhand is one of first states in the country to have a separate State Disaster Management department. But, it is evident from the details covered that, in spite of Uttrakhand being equipped with Disaster Management department and disaster management plans, faced major

difficulties in organising response in the wake of floods in June 13 owing to coordination, command and control issues. Resultantly, various response and relief agencies were responding individually in isolation at least in the initial stages. All this led to adhocism, duplication of effort and suboptimal outcomes. While individually all response agencies did well. Collectively they could have done much better. This argument clearly brings out that those trained must be put to good use in preparedness of the state and response when required. Disaster management plans must be disseminated down to functional level and be acted upon in time. Having done all this, the entire response machinery including outside agencies and stakeholders must be integrated in to a system to ensure synergy in response. Had IRS been institutionalised in the state and used in preparedness & response, the outcome in the instant disaster would have been much better and may be some more lives could have saved[136]. The State government must adapt the IRS in the response mechanism and get its officials trained in IRS for effective disaster response, so that the State Government is self-sufficient and less dependent on armed forces and other agencies[137].

[136] Praveen Pawar, UN Disaster Management Team at Rudraprayag, in an unstructured interview, 28 Feb 2014.
[137] 'Report on Uttrakhand Disaster, 2013' Prepared by NIDM.