

An Exposure Visit to Uttarakhand: Brief Report and Recommendations

A study visit to Uttarakhand (Chamoli and Rudraprayag district) was organized by the Department of Revenue- DM, Government of Himachal Pradesh with the support from United Nations Development Programme and GIZ for a period of One Week (19th May 2018 to 27th May 2018). The following officers participated in the study programme:

1. Shri D.C. Rana, Special Secretary (Revenue and Disaster Management), Team Leader
2. Shri Vivek Chandel, ADM, Solan
3. Shri Vinay Kumar, ADM Bilaspur
4. Shri Akshay Sood, ADM Kullu
5. Shri Rajiv Kumar, ADM Mandi
6. Shri Rohit Rathour, RC Pangi
7. Shri Nishant Thakur, AC to DC Shimla
8. Shri Rahul Chauhaan, SDM Sundernagar
9. Shri Vikas Sood, JC to MC, Shimla
10. Shri L.R. Verma, SDM Paonta Sahib
11. Dr. Suresh C. Attri, Principal Scientific Officer, DEST, HP
12. Shri Manas Dwivedi, SPO, UNDP, Himachal Pradesh.
13. Shri Heera Singh Shandil, Account Officer, HPSDMA

2. Background

Uttarakhand, one of the hill States of Northern India, was severely hit by heavy rain induced flash floods and landslides in the 3rd week of June, 2013. This abnormally high amount of rainfall has been attributed to the fusion of Westerlies with the Indian monsoonal cloud system. This has resulted into huge loss to lives and properties and specially disrupting the peak seasonal activities to Char Dham Pilgrimage. The melting of Chorabari Glacier and eruption of the Mandakini River has led to floods near Kedarnath Shrine area, Rambara, Agostyamuni, Tilwara, Guptkashi in Rudraprayag district. There were torrential rainfall in Himachal Pradesh and Western Nepal, and in other nearby regions of Delhi, Haryana, and Uttar Pradesh and some parts of Tibet. Pilgrimage centres in the region, including Gangotri, Yamunotri, Kedarnath and Badrinath, are visited by thousands of devotees, especially during May to September. Over a lakh people were stuck in various regions because of damaged roads, landslides and flash flood induced debris. People in other important locations such as the Valley of Flowers, Roopkund and the Sikh Pilgrimage Centre Hemkund were stranded for days together.

3. The study visit had following distinct Objectives

- I. To visit State Emergency Operation Centre, Dehradun, Uttarakhand, DEOC of Rudraprayag and to observe Early Warning System along the River Bhagirathi/Ganges.
- II. To see Hon'ble Prime Minister's recovery and reconstruction projects in Kedarnath as this would be a model for pilgrimage sites everywhere.

III. To meet Nehru Institute of Mountaineering Officials in Kedarnath and Shri Chandiprasad Bhatt at Gopeshwar, Chamoli district (Recipient of Raman Magsaysay, Padam Bhushan and Gandhi Peace Prize, founder of Chipko Movement) to share experiences and best practices.

IV. To see monitoring of Yatra through online CCTV at DDMA, Rudraprayag.

To reiterate the objectives in nutshell, it was aimed at gaining exposure and learning from some of the Post disaster recovery, reconstruction and rehabilitation projects implemented in Uttarakhand to strengthen and enhance Post disaster recovery and implement Build Back Better approach.

Therefore, the visit to various organizations, especially the following, has given deep insight and opportunity to learn and exchange ideas for the participants, as per the schedule below:

SCHEDULE OF VISIT

Date/Day	Schedule of Meeting and Visit of Important Places
20 th May, 2018	Meeting with Shri Piyoosh Rautela, Executive Director, Uttarakhand Disaster Management and Mitigation Centre, Dehradun, Uttarakhand.
21 st May, 2018	Visit of District Emergency Operation Centre, Rudraprayag, Uttarakhand.
22 nd May, 2018	Visit of Sonprayag and Gauri Kund
23 rd May, 2018	Visit of Kedarnath, Meeting with officials of Nehru Institute of Mountaineering, SDM Kedarnath. Visit of surrounding areas of Kedarnath.
24 th May, 2018	Meeting with Shri Chandiprasad Bhatt, Dasholi Gram Swaraj Sansthan, Gopeshwar , Chamoli
25 th May, 2018	Meeting with Shri Bhuvan Chandra Uniyal, Mukhya Dharmadhikari, Badrinath Temple, Chamoli, and Uttarakhand.
26 th May, 2018	Travel day (Badrinath to Dehradun)
27 th May 2018	Travel day (Dehradun to Shimla)

4. Visit and Discussions with key Institutions and People: -

4.1 State Emergency Operation Centre, UKDMMC, and Dehradun:-

The Himachal Pradesh delegation visited State Emergency Operation Centre (SEOC) and met with Dr. Piyush Rautela, Executive Director, Uttarakhand Disaster Mitigation and Management Centre, Government of Uttarakhand and other officers. Dr. Rautela briefed the delegation about the functioning of the State Emergency Operation Centre. Detailed presentation on DRR activities of the State was given by him. The best practices of Uttarakhand were noted as under:

- I. Constitution of SDRF- To tackle the situation of any natural and human induced disaster and to provide emergency services, relief and rescue operation etc and for their effective implementation, State Disaster Response Force was formed in 2013. The State Disaster Response Force (SDRF) was constituted by the state on the lines of NDRF after the state suffered a huge natural calamity. In 2013, the state government's preparedness failed to handle the natural calamity in the state. The members of the SDRF are those who have been trained to manage the crisis period. The SDRF has been deployed during the Char Dham Yatra in full strength because route of the Himalayan shrines located in the state are considered as prone to disasters.
- II. Weather Monitoring Network- 107 automatic weather stations (AWS), 25 surface field observatories (combination of single Stevenson screen, optical rain gauge and AWS), 28 automatic rain gauges and 16 snow gauges being setup with the World Bank support for improving quality of weather forecasts in Uttarakhand.
- III. Earthquake sensor network- IIT Roorkee is installing 100 sensors in Kumaun region apart from 98 already installed in Garhwal region for providing earthquake early warning in Uttarakhand.
- IV. Real time monitoring of Kedarnath Yatra - All communication network was deviated and the failure of communication network jeopardize the rescue & subsequent operations in Kedarnath valley. All infrastructure of mobile service provider was damaged. After the Uttarakhand flash floods, Installation & commissioning of wireless Local Area Network in Kedar valley from District HQ upto Shri Kedarnath temple including video conferencing services, electronic surveillance, Wi-Fi, internet facility, hotline communication and



provision of hotspots at different points on yatra route were considered by the Uttarakhand government. IP cameras (PTZ camera with night vision) installed at all the important points. Network Video Recorder are placed at Sonprayag (MSC) with mirror backup at DHQ Rudraprayag having a capacity of recording & keeping data backup of all the cameras for 15 days. These high resolution cameras can be remotely rotated from the control room upto 360 degrees, with pan-tilt & zoom features. Using this local area network as the backbone for communication, RFID tracking of mules carrying pilgrims along the yatra route, is being carried out by the district administration. Tags have been put on all the mules/horses that are registered by Zila Panchayat before the start of yatra. A computerized prepaid payment facility is being run by the district administration for streamlining the movement of these mules & horses that are used for ferrying the pilgrims along the yatra route. Mule Tracking Software that has been developed keeps record of every mule/horse ride in the form of Registration Id of the hawker, Registration no of mule, details of Pilgrim on-board with his biometric Id and time of checking in/out from the sensor point installed along the yatra route for live tracking. RFID Tracking of mules/horses (ISO 9001:2008 certified project) carrying the pilgrims (with all their details tagged) along Kedarnath yatra route is very vital & is being strictly followed so that harassment of pilgrims at the hands of hawkers/ mule owners & other types of problems encountered earlier can be effectively tackled. A hot line Communication setup has been established using SIP Phones. All the Major Points on yatra track have been provided with the facility for a seamless communication during any type of weather conditions. SIP servers are placed at both the MSC for trunking calls. Disaster management staff sitting at DHQ now has the privilege to call any point on yatra route during any type of weather conditions. All destinations have been provided separate contact numbers for intercom facility. This hotline communication is on full-time basis available to DDMA Rudraprayag and is independent of any mobile/landline service provider. District Administration is providing free wifi-internet access to the Pilgrims Visiting Shree Kedarnath Dham right from Sonprayag to Shree Kedarnath temple covering all major points like Junglechatti, Bhimbali and Lincholi, Base camp. Administration has also given the facility of free internet Kiosk Desks at Kedarnath, Sonprayag and at Lincholi. LCD Screens have been deployed for the public to View Live access of all the cameras both at Sonprayag And at Kedarnath.

- V. Adequate and Proper EOC setup- The SEOCS and DEOCs have been setup in the State for 24X7 operations with all necessary communication equipment like Satellite phones and mobiles for SMS alert system and basic disaster response equipment in the EOCs.



Commander SK Raghav (Ex- Indian Navy), Advisor and Consultant, Solas Marine Services gave a detailed presentation on recently executed AWAS system (Advance Warning Alert System) on rivers Bhagirathi and the Ganges in Uttarakhand, starting from Koteshwar temple up to Triveni

Ghat, Rishikesh (08 towers), with two control rooms at THDC's (Tehri Hydro Development Corporation, Limited, Uttarakhand) Koteswar dam site and SEOC, Disaster Mitigation & Management Centre (DMMC), Dehradun. The system broadcast prerecorded verbal messages along with siren. Specific message may also be broadcast directly from the SEOCC and Power Projects Control Room.

The sirens are required to meet specifications for operations: under harsh outdoor environment, meeting Federal Emergency Management Agency (FEMA) standards. Primary communication mode for actuating remote sirens through V-SAT network and backup communication mode is by GSM / CDMA cellular based network. The system is fully operational as programmed and has been handed over to the user, THDC, and is in use since then. It was learnt that the Uttarakhand got these systems installed to attend the vulnerable people downstream the project after the Thalout incident which took place in Himachal Pradesh. The system appeared to be a real alert system making understandable warning to the vulnerable population.

4.2 District Emergency Operation Centre, Rudraprayag, Uttarakhand

The delegation was apprised about the Innovative Use of Technology in e-Governance in Kedarnath region i.e. setting up of wireless LAN in Kedar valley from District HQ upto Kedarnath temple including electronic video surveillance, Wi-Fi internet facility, V.C. Services, hotline communication and provision of hotspots at different points on yatra route, Rudraprayag. The objective was to instil confidence in pilgrims regarding their safety and security, providing e-services network support to reconstruction agencies and providing surveillance, disaster management & mitigation tools to Police/Civil administration. A robust RF based local wireless intranet network was thus established using wireless hopping technique from Sonprayag to Kedarnath Shrine (at 11,600 ft) along a 21 Km long foot trek route. In spite of subzero temperatures, heavy snow/ rainfall the network was able to provide services like free Wi-Fi internet, hotline SIP communication, Video conferencing, RFID tracking of mules, public display screens for live feed of major points, deployment of Kiosk machines for internet access and 24X7 electronic surveillance of Kedarnath yatra route using high end night vision PTZ cameras for tracking movement of pilgrims, real time monitoring of ongoing works & vulnerable/ landslides/ Avalanche prone points enroute. Network has been extended from Kedarnath to DHQ covering a distance of 96 Kms along 17 base stations. This flagship IT initiative has also been one significant contributor in giving a strong message regarding the safety of the pilgrimage leading to increase in number of pilgrims coming every year in a very short span of time thus helping in reviving the Chardham Yatra & economy of the region. The live feed of the input is done at Rudraprayag district HQ to the NIC network as a result of which it can be viewed at State EOC and by the PMO at New Delhi.



4.3 Nehru Institute of Mountaineering Camp Office, Kedarnath, Rudraprayag :-

Shri Manoj Semwal, Incharge, NIM Kedarnath Camp Office told us that the task was handed over to NIM officially on 11 March 2014. The institute began its work within a week. Col Ajay Kothiyal, Principal, NIM, deployed a team of 300 trained men who worked day and night to reconstruct the Kedarnath town, and rebuilt the crucial route between Rambara and the holy shrine. However, the work needed to be completed within a very tight deadline, and so it was divided into two parts along the 22 kilometre-long hilly stretch from Sonprayag to Kedarnath - one part to Rambara and another from Rambara to the Kedarnath shrine. NIM was assigned to build the latter part in the higher reaches, which were more difficult access and therefore, a more arduous task. Rebuilding the stretch between Sonprayag and Rambara was handed over to government agencies.



The floods and landslides had wrecked the pedestrian route above Rambara and there was no rebuilding possible on this side of the hill at all. So the team from NIM altered the route and started reconstruction on the opposite side of the mountain. A temporary bridge was built on the river at Rambara to transport the building material, stones and machinery like JCBs, small tractors and all-terrain vehicles. It was not easy to move the machinery and other heavy goods to the heights of Kedarnath, so between April and August, NIM built eight big and small



bridges. In July 2014 year, two cantilever bridges were mounted on the river in less than three weeks! The volunteers of NIM had to face a number of problems especially in winters when the snow level rose - 12 to 14 feet high sometimes - and the bone-chilling cold made it difficult to move their hands. Diesel would freeze and every morning they would burn jute bags under the vehicles' tanks to melt the frozen fuel. This work of reconstruction could not have been done before at least five years. Mr Semwal added, "The yatra was to be closed for five years as well. But then the former Chief Minister, gave us the challenge to do this work before the start of the yatra next year. He gave us a free hand. We worked hard day and night, and the yatra started in one year. Our colleagues did this challenging job which specialist construction agencies had refused." He also added that Expert agencies had insisted that construction work should not begin too soon after the disaster, and not without due scientific planning. He also added that heavy buildings should not be constructed over glacier debris. If you look at the architecture of traditional societies at these heights, you always see that wood or other light-weight material has been used. In Kedarnath, nature gave us an opportunity by slapping us with this devastation. We should have taken lessons from traditional knowledge prevailing in the region of light buildings with sloping roofs of wood and stones. Col Ajay Kothiyal, Principal, NIM organized/engaged around 1,200 Nepalese labourers who were provided with basic equipment and clothing to brave the snow which in March was over 10-ft deep. The officer then chalked out a new alignment on way to Kedarnath, starting from Rambara. They worked round-the-clock in rain, snow and sleet. The NIM has also registered a company namely Wood Stones Construction. A three-tier wall has been built to save the town from any flood in the future consisting of Stone wall, Barbed wire fencing and RCC wall. It was seen that the Mandakini river changed its course and has now merged with Saraswati river in the south. The original course of Mandakini on the North side has got blocked with a 15 m high debris mound which have already been removed with the help of controlled or chemical blasts and now Otherwise the collective water volume of these two rivers can wreak havoc in the valley, now both the rivers were channelized. During the reconstruction efforts, the road leading to the Kedarnath temple was widened after removal of encroachments. The Monitoring of the Kedarnath reconstruction is done at the level of District, State and Prime Minister's Office from latest technology including Drone camera. A new hydro-power project was set up in Kedarnath by the Uttarakhand Renewable Energy Development Agency (UREDA) to provide sufficient electricity to the valley. The project was executed by the Nehru Institute of Mountaineering (NIM). Twenty years ago, a 100 KW project had been set up here, but it has not been able to generate enough electricity to meet current requirements. Besides, the regular

breakdown of power supply has affected reconstruction work after the 2013 floods. Once all the new buildings in the area come up, demand will increase.

4.4 Shri Chandi Prasad Bhatt, Dasholi Gram Swarajya Mandal, Gopeshwar, Chamoli

welcomed the delegation from Himachal Pradesh. He informed all about the various drawbacks of activities against environment, which often led to the distortion and destruction of natural resources, biodiversity and ecological imbalances. He narrated various practical experiences and case studies, particularly people's movement led by him from 1960s. He put up his critical views on Uttarakhand's pre and post disaster situation mentioning ecological imbalances. He narrated various disasters occurred in 1970, 1978, 1991, 1998, 1999, 2012 and how local communities handled these disasters in the absence of central monitoring agencies like NDMA, DDMA, SDMA, Local, State and Central Government. In those situations, people learnt from ground realities and had worth practical exposures that state DM policy must tap with.



He suggested that need of the hour is that the government should step in at all the levels for mutual cooperation, coordination, integration, decentralization of the responsibility and authority. He emphasized on proper documentation of all the averse and reverse situations of Indian subcontinent, Himalayan region, coastal region, including Bay of Bengal, Gulf of Kutch, and Indian Ocean. He put forward his points for data sharing, information sharing, quick response, and development of integrated Early Warning System, Geo-Informatics studies, and many others like weather forecasting, wind flow chart, etc. Landslide Hazard Zonation Mapping of Uttarakhand has already been conducted by the National Remote Sensing Agency, Hyderabad which helped in identification of vulnerable locations and possible landslide zones. Such study also conducted for Kedarnath, but the master plan and current reconstruction does not take note of it. Climate Change scenarios should also be developed for Agriculture, Horticulture, Biodiversity etc. He said that Himachal Pradesh should look at landslide study conducted by National Remote Sensing Agency, Hyderabad, which will help the State for future planning.



Shri D.C. Rana thanked Shri Chandiprasad Bhatt for giving his valuable insights and applauds his efforts for conserving Himalayas.

4.5 Concerns of Shri Chandi Prasad Bhatt regarding Kedarnath Reconstruction: -

Shri Bhatt expressed his concern and said that despite these remarkable efforts, some serious concerns about the structures erected now cannot be ignored. Particularly the construction of huge, embankment structures such as ghats, protection walls, etc., may cause some serious problems in future. The carrying capacity of this fragile terrain doesn't allow these kinds of big structures. The Kedarnath Township is built on thick moraine, which was deposited by the glaciers few thousand years ago. After the disaster, the newly deposited morainic debris is still unconsolidated and any big construction work on this thick, loose sedimentary deposit may have tragic results, much like what happened in 2013. He further explained why this construction could be dangerous, "It all depends on how we handle this loose surface. If we start heavy construction on this sediment, without reinforcing it, even if there is no disaster in the future, we could face a lot of problems. The buildings can still collapse because of the phenomenon called "solifluction" where the snow melts in the summers and a process called creeping of the soil may happen due to this frost action." The problem is further magnified by the scouring action of high-energy rivers from both the sides of the township.

Though Kedarnath has seen reconstruction on a massive scale, the future of the people who live in the mountains still remain uncertain. The affected families were paid some compensation but in the absence of adequate rehabilitation and a steady employment scheme or livelihood options. Some people have managed to pull their lives along, but most who lost their homes and shops have nowhere to go. The life of small towns along the route to Kedarnath thrived on the banks of Mandakini, but the river wreaked so much havoc during the disaster that many find it hard to rebuild their lives again.

4.6 Gaurikund and Sonprayag

Gaurikund is important as the motorable road for Kedarnath pilgrims ends here and they subsequently walk 16 km to reach the temple. Gaurikund has been a hub of activities for the pilgrims till the 2013 natural disaster caused large scale devastation there. Gauri village that forms part of Gaurikund played a key role in relief and rescue operations providing succor to many pilgrims in distress. Gaurikund, the key base camp for trek to Kedarnath, that saw large scale devastation has witnessed little reconstruction efforts. The places of pilgrimage such as Karmkund and the Gauri Mai Mandi in Gaurikund were severely devastated. Local shopkeepers and villagers have made temporary arrangements for bathing for pilgrims at Karmkund but the administration has taken no measures.

The human need is more important than anything else, and the fragile ecological system is at the stake like everywhere else. The recently constructed Bus stop/ parking place at Sonprayag is highly vulnerable due to its



proximity with Mandakini river. There is a registration counter at Sonprayag, where every tourist must register before moving further to the trek. To conduct the whole Char Dham Yatra in a controlled manner, the registration of the pilgrims became mandatory after the flood of 2013.

4.7 Badrinath

Shri Badrinath is prone to snow avalanches. In order to protect the historical temple from this hazard, the temple committee established snow avalanche mitigation system with the support of Swiss Government as may be seen in the pictures. These Avalanche ramps allow passage over installations and buildings. Avalanche wedges deflect the snow, break the speed of descending masses of snow and ice and thus provide protection to buildings and installations. This project has already been completed to protect the temple of Badrinath.



5. Recommendations:

Out of the many things the team has seen and learnt from interactions with different stakeholders and project site visits, the following are some of the key recommendations, the team would like to emphasize:

1. The State should establish automated early warning system (EWS) on the pattern of Uttarakhand which will help downstream the dams to alert the general public as per the CWC guidelines issued in 2014 after the Thalout, Mandi, tragedy. Effective and understandable Public Alert System along with all river beds which have dams constructed on them by the Dam Authorities should be got installed. Let Himachal learn from Thalout Mandi. Uttarakhand has learned from Himachal Pradesh and installed Sirens with voice message dissemination facility installed along the course of Ganga between Koteswar and Rishikesh at 08 places with the support of THDCIL.
2. Proper space for State and District EOC with adequate equipment is highly recommended.
3. 107 automatic weather stations (AWS), 25 surface field observatories (combination of single Stevenson screen, optical rain gauge and AWS), 28 automatic rain gauges and 16 snow gauges being setup with the World Bank support for improving quality of weather forecasts in Uttarakhand. On the line of Uttarakhand, the Himachal Pradesh needs to improve its weather monitoring system. As on today IMD has its network at a very few places. The State may write to Government of India and may consider following Uttarakhand model.
4. On the lines of Uttarakhand, the Government of Himachal Pradesh should consider the formation/constitution of State Disaster Response force for swift action in natural as well human induced calamities/disasters.
5. IIT Roorkee is installing 100 sensors in Kumaun region apart from 98 already installed in Garhwal region for providing earthquake early warning in Uttarakhand. The similar work should also be considered for the Himachal Pradesh as the State lies on the Earthquake seismic zone IV and V and we have very low density of Earthquake sensor networks and observatories. The HP should adopt Uttarakhand model and may request Ministry of Earth Sciences, Government of India to provide support to install such sensors and observatories for better monitoring and response of Earthquake disaster.
6. In disaster prone areas of Himachal Pradesh, where pilgrims constitute a major proportion of floating population, there should be an effective pilgrim management system (Registration of Pilgrims/Biometric registration). This will enable control of movement and assist in rescue and relief operation in any adverse situation.
7. The State Government may consider the implementation of the surveillance system and software solutions including cameras surveillance and yatra management systems for Shri Manimahesh Yatra on pilot basis. If found effective, it may be replicated in other yatras. It will surely help the district administration to ensure better coordination of yatra from DEOC, Chamba and provide a strong message regarding the safety of the pilgrimage leading to increase in number of pilgrims coming every year in a very short span of time thus helping in reviving the Manimahesh yatra & economy of the region.
8. The State may follow the Uttarakhand model of Heli Taxi Services. In case this type of service is replicated in the Himachal Pradesh, it will benefit traders and the local populace and will surely help to boost tourism in the State. This will also help to identify the various Heli service operators and identification of helipads, which can also be used during disasters.
9. Monitoring of all the Major temples, religious fairs and Yatras on the line of Kedarnath model.