



## RESEARCH ARTICLE

### DISASTER RISK REDUCTION; EXPERIENTIAL LEARNING, UTTARAKHAND

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#### ABSTRACT

This paper aims to develop a real perspective on what should be done for minimizing disasters in Himalayan state Uttarakhand. Many consequences such as casualties, infrastructure and livelihood are faced by various communities during disasters. Ultimately, preparedness at the local level is only the answer. In 2007, Capacity Building for Poverty Reduction Through Disaster Management; A project funded by Department for International Development (DFID) / Department of Personnel and Training (DoPT), Government of India to Uttarakhand Academy of Administration, Nainital, was an experiential learning to generate the database at eco-tone working zone (a different levels of various functionaries maintaining linkages between the locals and government authorities), to identify the performance problems and to develop, test and formalize an intensive district training model for public service delivery for front line personals and locals. Orientation, Training Need Analysis (TNA) and Training of Trainers (ToT) were applied as a tool. 39 participants were participated in orientation programme at Bageshwar (a township and district headquarter). In order to identify training and non training areas; Training Need Analysis" was conducted in Kapkot, Bageshwar and Garur blocks with 57, 70, and 67 participants respectively of District Bageshwar. "Training of Trainer's" programme was conducted in all the said blocks with 470 participants for strengthening their skills. Medical /health /first aid, water resources, horticulture, animal husbandry, agriculture and earth quake resistant construction were identified as key training areas. Lack of resources, infrastructure and emergency operation system, medical/ paramedical staff leading to poor support to the victims, water sanitation, maternity facilities, health facilities, water supply, banking facilities and lack of communication facilities at block and villages had been found as non training areas. The role and inter-relationship of development/training at block/village level was analyzed to build capacities at grassroots stakeholder.

**Key words:** Disaster, Capacity building, Training Need Analysis, Training of Trainers, Poverty Reduction, Landslide, Earthquake and Climate change.

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#### INTRODUCTION

Himalaya is newly born active mountain systems in the world which is also very vulnerable due to frequent earthquakes, Glacial Lake Outburst Flood (GLOF) and cloudburst. There has been an increasing trend in disasters events whether in terms of frequency or damage, which has caused human casualties, economic and ecological damage. Uttarakhand state of India, which lies in the central segment of Indian Himalaya Region (IHR), had already witnessed two major earthquakes in 1990 and 1999 (Naithani *et al.*, 2008) and severe devastation in Kedarnath in 2013 by GLOF. Heavy rains June 2013 led to heavy devastation and Chorabari lake burst caused flooding and heavy devastation in downstream upto Sonprayag and completely washed away Gaurikund, Rambara and Kedarnath towns (Amit, 2013 and Anand, 2014).

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Field visit interview and media report suggests loss of large number of human lives and heavy damage to infrastructure and livestock (Dobhal *et al.*, 2013). The state is also susceptible to other natural hazards like landslides, cloud burst, flash floods and forest fire events. Moreover, its vulnerability to earthquake can be understood with its seismological location under the Zone IV and V. It is the well known fact that the rural communities get most affected as a consequence of disaster. In fact the most vulnerable are children, women and elderly people in these natural events of disaster either in terms of victim as victim or as the dependent. The disaster causes indirect loss to production, employment and livelihood (Kumar, 2006) and also emotional stress, trauma; destroy homes and business leads to economic and financial hardships. During any calamity it is the local community or local villagers who face a chain of adverse situation till the relief and rescue operation, initiated by the external agencies. To cope with these adverse situations and reduce dependence on external support, an aware and self sufficient community is essential to be created through appropriate trainings. Usually, basic orientation

and information dissemination programme on Disaster Risk Reduction (DRR), for local authorities as well as to other key stakeholder are lacking or readily exists in our present system. Hence, provisions are must to impart training on preemption, preparedness, rescue and relief to the local people at village level. Moreover, focus should be on Village Panchayats, Mahila Mangal Dal, Yuvak Mangal Dal, Biodiversity Management Committee (BMC), Van Panchayat, Schools and the local Non Governmental Organizations (NGOs).

### Need of the Programme

During the critical hours of a disaster occurrence, a district administrator requires information regarding the population likely to be affected, availability of the resources, critical infrastructure (hospitals, police stations etc), available evacuation routes, and channels for communication etc. For effective decision-making. Currently, there is inadequate number of trained professionals at the Block or Panchayat level to utilize the existing resources and to assist administration, particularly during disasters. During the calamity it is the villagers who have to face the situation till the relief and rescue operation is initiated by the outside agencies. Therefore, we have to create a local manpower that can deal with the situation till external intervention comes. This will save many lives and provide a sense of security to the local people. Hence at village level, provision should be made to impart training for preemption, preparedness and rescue- relief to the local people especially the village panchayats, Mahila Mangal Dal, Yuvak Mangal Dal, Bal Sena's (in order to sensitize the future generation) and Non-Governmental Organizations. A Orientation and capacity building is the method by which such research of social significance should be passed on to the trainers and even the community that are involved in disaster mitigation and planning work for their sustainability and livelihood. Technical and financial support and training should be provided by the nodal agency for various aspects for disaster when central government and state agency are already assisting financially. Keeping above points in view the poverty reduction can be seen in context of disaster Management is an integrated approach. Capacity building of concerning authorities (7desk and Panchayat Raj with Gram Vikas department), panchayat functionaries and village communities on integrated subjects like; watershed management, Swajal agroforestry, geohazards, advocacy for disaster management, gender and disaster management, technological inputs (Mason trainings on earth quake resistant construction including retrofitting), survival techniques (post disaster activities), Village level mapping using GIS and GPS with people's participation will certainly lead towards sustainable development and better livelihood practices as far as poverty reduction is concern. This Training programme was particularly aimed at sensitizing and developing skills of the concerning Govt. officers, panchayat functionaries and communities involved in the disaster management for better disaster -relief management and sustainable livelihood practices. It was focused on fundamental principles, methodologies, skill development and hands on training (Mapping, mason training, Search & rescue-relief, communication, incident reporting practices in disaster management.

### Objectives

To develop, test and formalize an intensive district training model for public service delivery for front line personals and locals.

### Specific Objectives

- To prepare a document on existing training experience/resources.
- To design and finalize the district training working modal.
- To select the district and sector for testing the modal.
- To finalize target group through different methods
- To conduct Training Need Analysis (TNA) and Training of Trainers (TOT)
- To conduct a survey to assess the training impact
- To conduct monitoring for evolution and documentation of the programme.

### Study Area

The District Bageshwar forms a part of the Middle & Higher Himalayas covering three blocks viz; Bageshwar, Kapkot and Garoor. The total population of the district is about 247163 Out of that the Sc population is about 63827 And the ST population in the area is about 1943. The district is having total 363 panchayat and 2263 panch for village panchayats. The place is the confluence of Saryu and the Gomti which is seismically very sensitive and falls in the zone V.

### MATERIALS AND METHODES

**Selection Criteria:** District Bageshwar was selected as one of the remote district in the state of Uttarakhand along with the following reasons:

- Money order economy (most of the villagers are military personnel and other casual labours)
- One of the most vulnerable; tectonically sensitive
- As the area is remote; the communication and transport is less
- Far from rail and other normal infrastructure facilities

Administrators, Disaster Management Professionals, Officers of 7 desk system, Panchayat Raj and Gram Vikas departments, Communities of the villages in the block of the identified District, Leading NGO of the concern block for base office along with other NGO's as a participants, block Pramukh with elected members of Panchayats (Panch, Jila Panchayat sadasya and kshetriya Panchayat sadasya), Mahila Mangal Dal, Yuvak Mangal Dal and Van Panchayat, Already existing SHG Groups in the block.

**Focus Blocks:** Kapkot Block, Bageshwar Block and Garur Block.

**Approach:** Three day non-residential decentralized training; Lecture, Group Discussion, Group Presentation through LCD, OHP and Pamphlets.

**Tools Selected:** Orientation (Brain Storming), TNA and ToT. With the help of above tools the training was conducted in Kapkot, Bageswar and Garoor block of district Bageshwar through DoPT sponsored project; Capacity Building for Poverty Reduction Through Disaster Management learning in Uttarakhand Academy of Administration, Nainital, was implemented in 2007 and 2008. The data was collected at Ecotone Working Zone (which is different levels of various functionaries maintaining linkages between the locals and

government authorities), to identify their performance problems and analyzed to segregate training and non-training areas. Initially in orientation Brain Storming programme total 39 (23 Male and 16 Female) participants were participated at Bageshwar in Sept. 2007. Afterwards, TNA was conducted in Kapkot (57 participants), Bageshwar (70 participants) and Garur (67 participants) blocks of District Bageshwar in Nov. 2007. Later, TOT programme were conducted in all the three blocks. In Kapkot block 77, Bageshwar 87 and in Garur 73 participants were trained in Feb. 2008 repetitively.

## RESULTS AND DISCUSSION

Within a district as a whole 470 participants were trained and various area specific performance problems were identified, among which inadequate capabilities to execute the present disaster management framework, lack of skills to execute emergencies, inadequate disaster experts at different levels (District, Block and village level), lack of effective coordination among various departments, Panchayatraj representatives at the level of preparedness, response, mitigations and rehabilitations pertaining to disaster, lack of awareness regarding disaster management among office staff, Panchayat functionaries and village representatives, lack of ability and operational skill of fire extinguishers and other equipments needed during the emergencies, lack of motivation factor to devote Govt. employees towards their job viz. proper accommodation, health, education, etc. and lack of skills to build Earth Quake Resistant Construction (EQRC) at village level, are important.

**Key Areas of Training:** Medical /health /first aid, water resources, horticulture, animal husbandry, agriculture and EQRC were identified as key training areas. Lack of resources, infrastructure and emergency operation system at block and village level as per provision, inadequate services of medical/paramedical staff in villages leading to poor support to the victims, inadequate water sanitation, maternity facilities and services in remote village, inadequate electricity, health facilities, water supply, banking facilities, family accommodation and office infrastructure, inadequate communication facilities, and lack of working environment had been found as non training areas. To fill these gaps the ToT was conducted on EQRC, medical /health /first aid, water resources, landslide, horticulture, animal husbandry and agriculture sectors. It was also proposed with revised strategy that the masons training and preparation of EQRC for the particular panchayat on the basis of vulnerability would be initiated. Along with knowledge based information dissemination approach the skill based capacity building approach would essentially be needed.

### The idea behind this approach was to extract the outcome in following fashion

- Change in attitude of front line staff and localities to adopt EQRC technology, even in the government operated programmes, afterwards these EQRCs can be handed over to Panchyat for their community welfare in future.
- The local mason would be future asset/resource for EQRCs in the village, block, and district or even for region. By adopting this approach the mason's economy will increase with improved sustainability of the area, Area/localities will be awarded /benefited by the live demo of constructing EQRC and retrofitting technologies, awareness level will

go high towards disaster mitigation in the region. Every district in the state will try to replicate this innovation to improve the situation of economic developmental process. Using this modal the awakening towards poverty reduction will play a vital role among stakeholders and all the central and state government construction schemes should be mandatory to construct building in EQRC fashion.

- However with this rapid change, the concerned authorities are in difficulties to monitor and manage the resources and infrastructure. Hence it is imperative to create a database of all the available information along with proper mapping of the resources to have a proper mechanism and management plan for better developmental planning processes (Naithani & Patwal, 2014).

**Futuristic approach:** Village level workshop for mobile mapping would be an important tool for digital database creation in village itself. Workshop Team would be participatory including revenue officers and other officials and team of experts. It is noticeable that a similar exercise had already been achieved successfully under NRDMS project, SSJ campus Almora in 2003 (Naithani, 2013), which must be replicated for eco DRR. Village Level Mapping must be incorporated in micro level planning and developmental processes with lead towards poverty reduction as far as the sustainable development is concern.

### Other Grey Areas

**Besides that, on the basis of survey, assessment and personal interviews many gray areas are there which need to be focused on**

- Base line data on natural resource conditions, landslides, fissures, cracks, potential blocked sites and landslide hazard zonation (LHZ) needs to be identified in the entire Uttarakhand state using high resolution satellite data. Considering that majority of slope failures along the roads and the villages occur during the monsoon. The above geomorphic features need to be monitored on regular basis in order to evaluate their susceptibility. This study should be undertaken at micro watershed level preferably at cadastral level or 1:12,500 scale.
- Uttarakhand lack widespread meteorological stations, hence data pertaining to rainfall, snow avalanche, wind and temperature are illusive. For an effective mitigation planning meteorological data provide significant insight towards understanding the causes of slope failure or flash floods. For example, the mean annual rainfall of the region is around 1500 mm and we will find that in years when calamity like 1977 Alaknanda flood or 1998 Madhmaheswar landslide (Benti and Paundar), it was not the increase in mean annual precipitation but the duration of rainy hours. It is therefore, essential that number of such station should be increased at micro watershed level taking into consideration the geographical variability.
- Climate change is a reality; the magnitude of its impact on the Himalayan eco-system is major concern area. More specifically there should be base line data on the existing resource (glacier, tree line, alpine flora and fauna, water bodies, agricultural practices (land

- use), local dependency i.e. population). Data thus generated can be compared with the available past record (~last 50 years) along with the meteorological data (where available) in order to assess the impact of climate changes on the ecosystem. Once the above data base becomes available, it would set the stage for scientific interpretation and methodological development for combating the threat posed by global warming to the higher Himalayan ecosystem (Juyal 2010).
- iv. There is a need to create village level disaster mitigation units also involving, youth, women and school children. Provision should be made that this group is given exposures in various forms of disasters that are frequented the state and possible preventive measures. This can be done by inducting the experts on the subjects who are available in many related institutions already existing in Uttarakhand state.
  - v. Community Based Disaster Management (CBDM) is the need of an hour as 69.77 % rural of population is residing in Uttarakhand (Census, 2011). The community contingency plan (formation of SHG's), blending of Indigenous knowledge with modern know how will be the better option for the Uttarakhand. Again by involving the school children a fortnightly or monthly foot marches with audio-visuals of earthquake induced calamity and how to save our life and property can be carried in various watersheds of the region in a cyclic way. Unless we do so, it is certain that we are going to be caught unaware.
  - vi. Finally the major aspect is the sharing of information which is still in a very formative stage in Uttarakhand need to be addressed. Communication tools such as satellite telephone, fax, hand radios, social media should be made available so that forecasting, timely relief and rescue operations would be conducted effectively. Communication satellites with dedicated channel should provide real time information of the vulnerable areas, which should function in an interactive mode so that the target audience can freely exchange their ideas and expertise. For instance; Motivation to the Tele communication agencies likes BSNL, Vodafone, Airtel, Reliance, Idea and Tata etc. to provide towers to the vulnerable areas. The common network should be developed which could be shared by all the service providers. The central government and state agency should assist financially and technically the nodal agency working in the field for effective implementation of the program.
  - vii. We have district disaster management centre whose role over the years is still limited, instead of that these centres should be revamped, upgraded with modern tools and trained manpower. The continuous mode of data collection and its monitoring would require modern computational systems such as high speed computers capable of handling large volume of data base (spatial and non spatial), image processing, GIS, networking of the area at village level.
  - viii. Over the years due to over exploitation majority of the watersheds become vulnerable towards landslides. Department of Science and Technology is currently providing lot of funds to various agencies including the universities for undertaking research in order to evaluate the causes of landslides and their mitigation. Unfortunately such studies have never been made public. Unless the findings are known to the people it would be difficult to assess their surroundings. Though we know a research scientist cannot do the job of informing his results to the people, but DST can at least make a provision that such research of societal significance should be passed on to the agencies that are involved in disaster mitigation and planning work. Basic methodologies of preventing soil destabilizations are known to everybody, however, the quality of work done for slope and channel stabilization is of very poor quality. There must be some common framework to evaluate the quality of work done and penalties for sub-standard work (accountability). Integration of modern and traditional engineering and bioengineering approaches for eco-rejuvenation of landslide affected areas must be initiated. These can be diversion drainage, crib structures, retaining walls, geo-textile, Kutta-crate structures and temporary check dams using loose stone masonry. However, there is no substitute for bioengineering technique that involves re-greening the barren slopes. In doing so, location specific indigenous plant species and structures would have tremendous success.
  - ix. For example the case of Nainital Lake, where during pre-independence for control on sediment supply and monsoon flow from the slopes was done through construction of stone channels particularly from the steeper China peak area (northern slope), which can be seen even today though in a very pathetic state due to unregulated construction activity.
  - x. Since industrialization, human activities have significantly altered the atmospheric composition, leading to climate change of an unprecedented character that ultimately results in increased global mean surface temperature. This warming has directly impacted the temperature sensitive snow and ice cover, resulting in rapid glacial melt that increase the size and number of glacial lakes to the stage of glacial lake outburst floods which calls for a major catastrophe in near future (Lakhera *et al.*, 2013). Majority of the rivers in the Uttarakhand are originated from these glacier fed lakes, however, limited information is available the hydrology of such lakes. In many countries, glacial lake outburst always leads to down valley flash floods events. It is therefore, essential that such lakes should be mapped and monitored. Viewing the inaccessibility of the terrain, the satellite remote sensing data can be of great help in this regard.
  - xi. During the calamity it is the villagers who have to face the situation till the relief and rescue operation is initiated by the outside agencies. Therefore, we have to create local manpower's that can deal with the situation till external intervention comes. This will save many lives and provide a sense of security to the local people. In order to sensitize the future

- generation, disaster management and training should be made a formal subject at school level.
- xii. At village level, there should be an organized system, which should be activated during an eventuality with a specific objective of collecting on the spot information, regarding the location, magnitude of damage incurred. In landslide and flood prone areas, provision should be made to constitute a village level disaster management committee, including village levels government officials. This committee should be constituted in line of Panchayati Raj system. They should be made accountable for relief and rescue operations as also for the rehabilitation of the effected population.
- xiii. People participation and involvement in the identification and control of landslide should be sought. Village level institutions (Panchayat, Yuvak Mangal Dal, Mahila Mangal Dal, and local NGO'S) need to be established to ensure proper maintenance and prevent resources utilization from the landslide rehabilitated areas. Technical and financial support and training should be provided by the nodal agency for various aspects for disaster especially prevention of landslide zones proliferation, mitigation of flash flood threats due to slope activation, relief and rescue etc. The central government agency should assist financially and technically the nodal agency working in the field for effective implementation of the program. People's participatory approach in disaster management planning is leading towards sustainable hazard mitigation (Naithani and Doval, 2014).
- xiv. Approaches must also be initiated to prevent the natural resources specially the biological resources which can be life supporting during disaster events. These can be conserved through integrated participatory approach either in terms of management and conservation as well as in terms of their sustainable utilization, trade and benefit sharing. In this process, provision on the Biological Diversity Act, 2002 can be understood. To meet the twin objectives of ecological sustainability by conserving biological diversity and ensuring needs of the forest dependent communities through sustainable harvesting of natural resources it is important to strengthen the existing egalitarian and traditional resource use practices among the local communities (Kumar, 2013). Nature based disaster risk reduction would play important part in mitigating the physical and socio-economical risks as a consequence of disaster. For example, if we would promote the ecotourism, it would encourage the community to save their natural resources so that we can generate maximum income through minimal infrastructural inputs and least or no environmental loss. The ecological or ecosystem vulnerability analysis is also needed because it directly associated with human well being and should be described at species, population, communities and ecosystem level (Lange *et al.*, 2010).
- xv. Uttarakhand is prone to earthquakes we have seen in the recent past two major earthquakes that has created

large-scale damage to life and property. Though since 1803 the Garhwal earthquake, no earthquake of magnitude higher than 8 has hit the region, but the Gorkha earth quake of Nepal, 2015 (Zacharie *et al.*, 2016) is the silence witness for understating and identifying areas of high seismic hazard in the Himalayan region.

### Conclusion

We have still not learned from the past incidences of disasters including earthquakes, flash floods and other consequences, during which the spree of poor quality construction is going on unabated. Therefore, it is important that people are needed to be sensitized if required through fear psychosis that any time they are going to be hit by the major earthquake. As we know that it is not the seismic shaking that kills the people but the negligence and quality construction. Government has initiated program for providing cement building blocks that are considered earthquake resistant, however, their accessibility is limited either in terms of availability or cost. Again by involving the school children and youth a fortnightly or monthly foot marches with audio-visuals of earthquake induced calamity and how to save our life and property can be carried in various watersheds of the region, these would be a resource as now and torch bearer to future generations as well. Unless we do so, it is certain that we are going to be caught unaware.

Possible remedial measures would be a boon for Uttarakhand provided TNA would be done while conducting vulnerability and assessment, augmentation of natural resource by database creation at village level, livelihood support option with resource development, training on disaster management practices with equipped community to combat disaster in future, ecological and economical rehabilitation with house, agriculture, horticulture etc. and planning, implementation and monitoring with people's Participation. We must keep in mind what eminent earth scientist from India Prof. K.S. Valdiya said long back that "*Unlocking of active faults in Uttarakhand is going to shake violently the region, one does not know when that happens, but it will happen certainly some day in the future*". With no choice, we must prepare ourselves, strengthen community (trainings) because disaster catches unaware and does not consider holidays.

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