

**Disaster Management in Mountain Economy---A Case of Uttarakhand  
State of India**

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# **Disaster Management in Mountain Economy---A Case of Uttarakhand State of India**

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## **I. Background**

The mountain habitats share certain similar bio-climatic features and concerns across the world, whether these are the Alps mountain regions of European countries or Andean mountain ranges in the South America (Venezuela, Columbia, Ecuador, Peru, Bolivia, Chile, and Argentina) or Hindu Kush Himalayan (HKH) region countries in the South Asia (Afghanistan, Pakistan, India, China, Nepal, Bhutan, Bangladesh and Myanmar). These relate primarily to the changing mountain environment due to degradation of resources owing to their excessive use. This has resulted in reduction in biomass production, marginalization and low human welfare. Many of these mountain regions are prone to natural hazards (landslides, earthquakes, avalanches, diseases etc. (Li Tianchi et.al. 2001). Human conflict and wars also concentrated in many of the poor regions (Libiszewski and Bachler, 1997) making the life of the mountain people more vulnerable. The minority inhabitants in certain mountain regions suffered not only from the resources exploitation but also from ethnic conflict, violence and wars (Ives, 1997). But then, there are major differences in the mountain economies of the developed countries of Europe and that of Andean regions and HKH regions in respect of their development trajectories.

Mountain regions of European countries (Alps) had much similar situations during the 18th Century to what exists today in the mountain regions of Andean or HKH regions. These Alpine inhabitants, for instance, had witnessed high poverty, out-migration, malnutrition and even outright starvation during Little Ice Age (1500 to 1850 AD) (Ives, 1997). European mountain regions developed fast primarily because of their strong external linkages with the developed regions experiencing industrial revolution, and in this process, mountain regions benefited significantly from this strong linkage effect (Messerli and Ives, 1997). Development of transports – both navigation and railways – had facilitated long distance trade. Large-scale out-migration helped in reducing the demographic pressure, and unlike most developing countries today, Europe at that time experienced faster growth of income than the population, thereby improving their standard of living. The potato, railway development after the mid-19th Century and later mass tourism and large-scale winter sports helped these economies to transform rapidly (Ives, 1997). Industrialization in the Alps has been closely related to the development of hydropower-based industries, and today, more than 50 per cent of the population of the region lives in urban areas. The tourism industry in Alps is most dynamic and competitive. Also, mountain-peasants in these countries receive large sum of subsidies from the governments and other institutions to encounter the limited incomes from mountain agriculture. Many countries (Austria, Switzerland, Germany, France, UK and Norway, for example) have some sorts of institutional mechanisms and state protection in place with considerable political will to ameliorate the in-built inequalities in the mountain economies. The strong linkages with the economically growing areas have thus been the main driving force for development of these mountain economies, and it is argued that further boost in linkages would have far-reaching positive impact on these regions.

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The other mountain regions have, by and large, embraced the development model that neglected the specific character of mountain regions which was entirely different than the plain regions. The main reasons behind for disregarding the mountain perspectives are defined as such “explicit or implicit consideration of specific mountain conditions and characteristics and their operational implications while conceiving, designing, implementing and assessing interventions in mountain areas” (Jodha et al., 1992). There are evidences of large infrastructural projects (dam and hydro-power projects, mineral exploration, for instance) coming up in the region particularly in HKH region disregarding the fragility and associated environmental hazards. When mountain perspective is disregarded in development planning and execution of projects and programmes, it has severe implications to the ecology, environment and livelihoods of people in the region. The frequent disasters such as landslides, earthquakes, floods and related destruction of human and animal lives and loss of livelihoods is a testimony of the development trajectory underway in the HKH region.

After a brief discussion of mountain economies in general and their disaster proneness in the first section, the second section deals with the mountain regions in the Indian Himalayan regions that are vulnerable to various disasters. The third section, in particular, deals with one of the mountain states of India namely, Uttarakhand that has witnessed many disasters and the worst disaster occurred in June 2013, entailing enormous loss of human and animal lives and devastation of property and infrastructures. The fourth section examines the damage and need assessment of June 2013 disaster and fifth section describes the pain and sufferings of people that have come out distinctly from discussions of the disaster affected people during field visit. The sixth section analyses the issues relating to rehabilitation and recovery policy measures and the last section concludes by suggesting policy measures from short, medium and long term perspectives.

## **II. The Indian Himalayan Regions**

The Himalayan region in the country covers 11 states, namely, Jammu & Kashmir (J&K), Himachal Pradesh, Uttarakhand, Sikkim, Arunachal Pradesh, Nagaland, Manipur, Mizoram, Tripura, Meghalaya and Karbi Anglong and North Cachar districts of Assam.

Himalayas are the world’s youngest mountain range and susceptible to erosion and landslides, seismic activity, rainstorm and cloudbursts. The fragility and other associated mountain specificities make these Himalayan states vulnerable to various disasters. Clearly, disasters are direct manifestations of the neglecting the mountain perspective in development. Many places in particular mountain stations and pilgrimage centres have become over populated and crossed the carrying capacity of these centres. Since these centres provide opportunities for livelihoods and employment and attract huge floating population to enter in the footholds of labor markets. This has had adverse implications to the ecology and environment. Also, over the years there has been rapid growth of population thereby putting increasing pressure on the limited cultivable land necessitated by increasing demand for food. Growing demand for food crops led extension from the hitherto cultivated areas on to the marginal and forestland (Papola, 1996). One of the important features of mountain economies is fragility which is related to delicate economic system, resources and livelihood patterns. Fragility occurs due to excessive use or exploitation of resources neglecting resource conservation, management and recycling. All this has had adverse impact on the land and forest resources making them economically unsustainable leading to environmental degradation. Floods, landslides, earthquakes and forest fires are common natural hazards resulting

in heavy loss of life, property and resources. Majority of the mountain states suffer from numerous natural and manmade disasters that have had devastating impacts causing deaths and destructions.

The main disasters witnessed in Himachal Pradesh are earthquakes, landslides, flash floods, snow storms, avalanches and draughts. However, the biggest threat to the State is the earthquake hazard that cause huge damage to both life and property. The state also suffers from landslides and floods during monsoons season due to torrential rains.

The most common disasters in J&K are earthquakes, floods, landslides, avalanches and snow storms. The Kashmir earthquake in 2005 and the Leh cloud burst (2010) and flashfloods are rated worst disasters in recent times.

North-eastern states including Assam is prone to natural disasters like earthquake, floods, landslides, cyclone and occasional draught. The whole region is one of the seismically most active regions of the world. North-eastern region is witnessed by heavy and prolonged rainfall that causes destabilization of mountain slopes and occurring flash floods and large landslides. Huge infrastructures build up (construction of roads, dams, etc.); deforestation and structural interventions on delicate natural systems are some of the major reasons for the frequent devastation. For instance, Sikkim witnessed most horrifying earthquakes in September 2011 that caused massive damage to the lives and property of the people. Over 100 people died, houses severely damaged, roads splintered in addition to huge losses to property. Landslide is yet another major natural hazard in the region that results in huge loss of life, agricultural and forest land in the state.

### **III. Disaster in Uttarakhand**

The mountainous region of Uttarakhand is fragile region which has witnessed frequent disasters in the form of earthquakes, landslides, cloudbursts, floods, etc. These disasters have taken heavy tolls on life, property, livelihoods and severe damage to environment and ecology. The disaster of 16-17 June 2013 was a grim reminder of colossal devastation in terms of large number of casualties and widespread damage to the houses, property, roads, bridges, buildings, forests, plantation, crops and agriculture land. The devastation caused by the disaster was so huge that it has been termed as Himalayan Tsunami. The affected districts in this disaster were Rudraprayag, Chamoli, Uttarakashi, Bageshwar and Pithoragarh. The most terrible hit zone was Rudraprayag district (Mandakini Valley) that saw the wreckage of Uttarakhand. As per the official records, 5,000 persons died and 13,307 livestock killed in the disaster. A total of 4,200 villages were affected by this disaster including 300 those severely affected. The loss of property was also huge as over 3,320 houses were completely damaged and no more remained liveable. Over 20,000 hectare of agricultural land was completely washed away, damaging about half of the crops. In addition, the disaster caused widespread losses of public utilities such as bridges, roads, schools and other government buildings, and drinking water schemes (World Bank, 2013; DMMC, 2014). Losses of property and lives have been massive and estimated to be in billions (Planning Commission, 2013). The disaster also left stranded over 70,000 tourists and 0.1 million local inhabitants in the upper reaches of mountain terrain of Uttarakhand. The biggest ever rescue operation in the history of disaster management has been undertaken by Government of Uttarakhand with the support of Army, Indian Air Force, Indian Tibet Border Police Force, National Disaster Response Force and Border Security Force. They evacuated more than 0.11 million people from the flood affected areas and also saved the lives of thousands of animals (World Bank, 2014).

The Government of Uttarakhand has been severely criticized for its lackadaisical approach towards implementation of important aspects of disaster prevention, mitigation and preparedness despite the creation of State Disaster Management Authority in October 2007 (CAG, 2010).

Disaster management never formed a part of development agenda in the state nor the disaster information system proved to be reliable and remained highly inadequate. Moreover, the type and magnitude of development activities initiated in Uttarakhand have huge environmental impacts as well. The unregulated tourism in Kedar Valley in recent years and related construction has seriously raised the issues concerning carrying capacity of such hill stations. It will be explained in later sections in this paper that how the impact of the disaster could have been minimized had the Government undertaken measures earlier towards its mitigation.

One of the critical aspects of disaster management is immediate provision of relief measures (evacuation to safer places, food, clothing, utensils, medicines, tents and health care, etc) that have profound bearing on saving the lives of people. There has been a tremendous response from numerous agencies including government departments, NGOs, CSOs, political leaders, corporate houses, donor agencies, individuals and alike to help disaster affected people. Owing to crippling road network, difficult and inaccessible locations, the relief measures unduly delayed and in some cases it took a month or even longer to reach the relief to the affected locations. The relief measures included evacuations and taking people in safer locations (mostly organized camps in schools and community buildings), providing medical aid, food, clothing and other necessary support. The immediate priority was evacuation of trapped pilgrims and local people from the Kedarnath temple area to safer locations for which helicopter services were pressed into action. The rescue operation was regarded as one of the biggest heli-rescue operations in India evacuating over 0.11 million people to safe locations. However, inclement weather conditions accentuated further the woes of trapped pilgrims.

The experiences of relief works are mixed one. Villagers applauded the role of armed and paramilitary forces, government agencies, NGOs, CSOs and several other individual initiatives in the relief work. The criticism was basically related to delay in reaching the relief material. It is being argued that many more human lives could have been saved in Kedarnath temple town and en-route to it had rescue teams reached to them in time. The severely damaged road network crippled the outreach of relief to the affected people. Loss of mobile connectivity rendered it difficult to gauge the actual extent of damage. Villagers have revealed their experiences of travelling very long distances through on foot on very dangerous tracks to receive relief material. In some villages helicopters dropped food items but it was inadequate. People in numerous villages of affected districts experienced huge diversity and non-uniformity of distribution of relief materials in terms of adequacy, quality and outreach despite relief material forthcoming in a big way. The primary reason for this was lack of coordination between different agencies engaged in relief works. The situation tremendously improved after government and civil society organisations (CSOs) worked closely in relief distribution. Villagers were satisfied with the quantity of relief such as food items, clothes, tents, etc. In Kalimath village in Rudrapur district villagers have very high regards for Border Security Force which provided them food, shelter and helped in reconstructing school building and road connectivity. There was complete confusion in the administration that had jeopardized distribution of relief materials. The supplies of food and other relief materials though was abundant but taking to affected areas was a big challenge in the hilly terrains. Nor district administration worked out any plan for relief distribution across numerous villages. Also, delay in relief material also evoked anxiety and soreness among the

beneficiaries. In any case, the relief measures are short term measures that essentially cater immediate needs of people but its long term consequences have been rarely analysed and investigated. It has been widely acknowledged the contributions of NGOs, CSOs, donors and corporate houses reaching out the affected locations and to distribute relief materials despite of numerous difficulties faced by them. This gesture was much appreciated by the affected households in several villages. In fact, NGOs reached much earlier than government with relief material to remote villages. Though, some dissatisfaction was also expressed the manner in which relief material was distributed under the influence of village heads and other influential people. Also, some lacunae were noticed in terms of coverage, adequacy and organizational aspect of relief management which was severely criticized by intended beneficiaries in village after villages. The role of State government in relief distribution material was limited and most relief activities were focused on evacuations of people in safer locations and providing medical support.

#### **IV. Damage and Need Assessment**

The immediate task was to make assessment of damages and work out suitable compensation for rehabilitating flood affected people. The magnitude of total losses of human lives, livelihoods, private properties, public infrastructure and utilities is difficult to estimate precisely but it must be indeed huge and in billions. The Government with the support of United Nations Disaster Management Team (UNDMT) and World Bank estimated the losses. Government announced compensation against loss of human and animal life, damage of houses, shops and establishments, loss of agricultural land, etc. The maximum compensation paid was INR 0.5 million in case of loss of human life and INR 0.2 million for completely damaged houses. Similarly, amount of compensation was decided in each case for loss of milch and draught animals, agricultural land, crops, shops and establishments. Relief was also given to purchase clothes, utensils, room rents for those whose houses were completely/severely damaged, and removal of debris from agricultural land.

Most of the respondents were satisfied with the amount of compensation and promptness in its disbursement. Unlike the earlier damages due to heavy rains, the amount of compensation was comprehensive and significantly high for the 2013 disaster. For example, unlike earlier years, households residing in the completely /severely damaged house were considered as units for compensation. The earlier practice of calculating compensation was based on the housing unit only. Due to this, there is disenchantment among those households/villages which have been affected during the heavy rains and cloud bursts of 2011 and 2012 given to each family residing in that house. Also, the owners of big houses in the villages and nearby market places feel the amount of compensation for their damaged houses less than satisfactory. There are concerns about the way in which losses of agricultural land and crops were measured by village revenue officials in a hurry. More so, the amount of compensation is pitifully low at INR 0.05 per hectare in view of very small size holdings in typical hill region. Compensation for the loss of agricultural land was calculated only for the registered land that was in the name of affected person. Similarly, amount given for removal of debris from the agricultural land was meager given the nature of human labour to be engaged therein for the task. Likewise, compensation amount for goat and sheep has been fixed INR 3,000 and for a bird INR100 which is awfully low.

It has been transpired from the discussions that the amount of compensation on various accounts was inadequate and insufficient and method of calculating compensation does not appear to be based on any principle of equity and fairness. Compensation amount so calculated was

universal in all the disasters affected locations in five hill districts disregarding the locational diversities and specificities. In some cases, the amount has been fixed arbitrarily and not on the basis of magnitude and intensity of damage. There are instances of undue delay in getting compensation even after one year.

Yet another unique case of long delay in the settlement of compensation relates to shops and establishment owners in Kedar valley. A little over 2,900 shops and establishments in Kedar valley areas have been shattered, either completely or partially. Four dozen big establishments and shops had been destroyed with estimated value of loss ranging between INR 1 to 3 million each. Loss of another 417 establishments completely damaged were in the range of INR 0.2 to 1 million. The total loss of such shops and establishments was estimated about INR 468.5 millions. No relief came forward to such entrepreneurs till three months after the disaster. Compensation for such a huge loss was completely ignored by the administration on the pretext that many of these properties were built on forest land and hence out of the purview of compensation. This denial united entrepreneurs of Kedra Valley under a banner of Kedar Valley Business Owners Association. After a strong political support, as revealed by Mr. Prem Singh Sajwan, President of the Association, Government asked the Association to make self-assessment of losses by the business owners. The local business associations' claims were verified by the members of umbrella business association. The damages of property were classified into five categories based on the self-assessment. A mix of compensation (40 per cent directly deposited in the bank accounts and 40 per cent given as loan) was adopted. In case of loan amount 50 per cent subsidy has been given under the Bir Chandra Singh Garhwali scheme and 4 per cent interest on the remaining half of the loan amount is to be paid after two years. Irregularities have also noticed in case of assessment of complete or partial damage of business establishments and shops for claiming compensation. A total of 100 self-employed traders and about 2900 Pandas (religious service providers) are still left from being considered for such compensation. The compensation amount fixed for them is INR 25,000. Cases of fake claimants of compensation have also been observed that has raised doubts about the credibility of area business associations who have forwarded the cases to sub-divisional magistrate office for claiming compensation.

Sl No.	Type of compensation	Amount (INR) per unit
1.	Human loss	0.5 million
2.	Special compensation to disaster widows	0.1 million
3.	Special assistance to 15yrs and above unmarried daughter from dead/missing persons family	1 million
4.	Completely damaged houses	0.2 million
5.	Severely damaged houses	1 million
6.	Partially damaged houses	15 thousand
7	Damage of agriculture land (irrigated) (per hectare)	12.5 thousand
8.	Milch animal	20 thousand
9.	Horses/ponies	20 to 50 thousand
10.	Room rent to those whose houses were fully/severely damaged (per month)	3 thousand

Source: Government of Uttarakhand

A most tragic aspect of disaster is the loss of human lives and agonies of those left behind. The amount of compensation given to such households is very critical but the loss of bread winners and near and dear are irreparable.

## **V. The Untold Misery and Despair**

The pain and agony of widowhood in Devali village Panchayat (local self-government institution at the village level) in Ukhimath tehsil (sub-district) is unparalleled by any recount. Fifty four young women lost their husbands, the prime bread winners, who were mostly temple pujari (priests) and related service providers at Kedarnath temple. Young widowhood is widespread in Devali and some are as young as 20 to 22 years old. Such widowed headed households find it extremely difficult to support their families and suffer from multiple deprivations within family and society. They are subject to abhorrent treatment in society and even in their own family. Many of them are suffering from heightened mental disorders and a sense of insecurity. We were drawn the trail and throbbing stories of widows -- one after another. The plight of young widows is enormously painful. They are constantly being eluded by the hope and living in abandonment and loneliness. Here is a tragic tale of Savitri Devi Tiwari, 27 years from Pithora tola (hamlet) of Devali village who lost her husband Hemant (31years), a priest in Kedarnath temple. She was married 3 years ago and has two children (boys) --- one is two and half years old and other is eight months old (born after the death of his father). Savitri was forced to give her younger son to her mother for caring and looking after, as she cannot afford to nurse both the children. Her father-in-law, Sriprashad (83 years) lost his two sons---Govind another one (50 years) --- in this tragedy. Guddi Devi, wife of Govind (45 years) has been living with father-in-law along with his two children. Savitri lives separately and has been given one room within same house by his father-in law and a small piece of land (0.15 hac). She cultivates the land and does all kinds of household duties, caring son and cooking. She has one room in nearby old and dilapidated house where she cooks her food. Savitri holds Masters (Sanskrit) degree and has been working aganwadi (courtyard shelter) worker in the village last for one year or so. She narrates her pain and agony that she has been undergoing after death of her husband; she has lost everything and has been living in the darkness of despair. She has been shunned by father-in law and looked upon her as curse to family and considered sign of bad luck. This has created adverse social relation within family. She has two small kids before her and she has no support for their education and for other expenses. She earns paltry sums as aganwadi (courtyard shelter) worker and takes son along with her. The family has deserted her and no one in family talks with her except Guddi Devi, another widow in family. Savitri cannot remarry either as it is completely prohibited by social norms and by the community. She feels shattered that after her husband's death there is nobody to take care of her. However, the village community has full sympathy for her and provides moral support. She pleads for a house where she can live in and a job that can provide sustenance to her and for her two kids. Any form of monetary compensation will not help unless social security in the form of children's education is ensured.

Yet another heartbreaking tale is of Sangeeta Devi from nearby hamlet---Bhanigram. Sangeeta is 28 years old and lost her husband Bipin Bagwadi (32 years) in the disaster who used to run canteen in Kedarnath. Sangeeta has three daughters Sneha (7 years), Anuska (5 years) and Avantika (4 years). Sangeeta is educated up to 12<sup>th</sup> class but she thinks that her education has no meaning. She cultivates land whatever little she has and looks after her three daughters. Daughters



are studying in local school. She has meager piece of land (0.10 hac) and a room in an old and battered house. She has been somehow managing life with little 3 daughters. Sangeeta's mother-in-law (Rampali Devi, 80 years) is an old lady and was screaming while narrating that she has lost son and three grandsons (Akshay, 15 years; Ankit 14 years and Himanshu 13 years) who had gone Kedarnath to assist their uncle Bipin. Sangeeta feels guilty for not having a son which is always preferred in a patriarchy social system. Anyway, she has to bear the brunt of three daughters which she feels difficult to carry this baggage alone. But Sangeeta, unlike Savitri, gets constant reassurance and supportive relationships from family which she thinks is invaluable asset for her. Indeed, government has to come forward and to do a lot for widowhood families and their children for bettering their lives through constant and uninterrupted support for their education and health and also to providing some form of livelihoods to the widows.

Another distressing story is from Indra Singh Bisht (49 years) of Semi Talli village (Ukhimath tehsil). Indra had seven story lodge (named hotel Shiv Palace) with 16 rooms in the road side on route to Kedarnath temple and a shop, a restaurant a house and a cowshed that was managed by him and his wife Deepa (44 years). On the fateful day of 8<sup>th</sup> August, 2013 (2.10 p.m. local time) the whole business premises crumbled in to fragments and everything swiftly submerged under rubble. For Indra and Deepa hope was perished forever. He started his business in a modest way back in 1991 with a small roadside *dhaba* (small restaurant). The family is living in a rented house and hard days are to stay for the family. The loss calculated by Indra is between INR 150 to 160 million which is insufferable and unbearable. Though he has got total compensation of around INR 1.25 million but he has lost his hope for rebuilding his business. He had taken personal loan of INR 1million from friends and INR 1.7 million loan under the scheme of Bir Chandra Garhwali for which he has to pay monthly interest of INR 17,500. Deepa had tears in her eyes while Indra was narrating the agonizing anecdote. Both Indra and Deepa are living under fearful and frightened situation. The similar story goes on to his sister-in law Parvati Devi who had also 12 room lodge and shop next to him and it met with same fate and everything fell like a pack of cards in a few seconds. Parvati did not get even compensation because the lodge and shop was not registered and she is fighting for the cause alone for this horrible nightmare.

Similarly, devastation and wrath not only descended on to individuals but it was so widely spread across households in village after village. The Semi village, for instance, saw damages of all its 50 houses either completely or partially. Nearly 16 houses have been completely damaged and 6 houses have badly damaged and remaining houses are partially broken. Loss of agriculture land has been reported by majority of households and eleven shops/establishments have also been razed. The village has been declared unsafe for human living by government and is to be relocated. But so far nothing has been done in this direction nor allowed to go for construction of new houses within village under the assistance of World Bank scheme that provides INR 500 thousands. *Gram Pradhan* (village head) Smt. Kunwar Bartwal (50 years) has been relentlessly fighting for the cause but of no avail. Similarly, Kunjethi (talli gaon), another village, is also to be rehabilitated. The agony and anguish of these villagers haunt them as they live under the constant threat of insecurity and uncertainty and government have remained mere spectators.

Yet another village Jailley in Jakholi tehsil has seen horrible destruction through landslides. There are in all 91 households and 84 households have been affected by landslides. Landslide is recurring feature here, in particular since 2012 and 2013. Till date only about 28 households received some compensation while others are still waiting for government mercy. Amar Uzaala

Foundation (India's fourth largest Hindi-language daily newspaper with charitable arm) has initiated construction of temporary tin sets for 35 households that is costing INR 90 thousands per set. People are highly antagonized and upset by the callous attitude of government authorities. Tired of living under fear and apprehensions, 10 households have migrated out in other places within the vicinity of village while 5 households have moved out from village for safety and security.

**Table: Preliminary Assessment of Disaster Damage in 2013**

Sl.No.	Nature of damage	Number
1.	Affected persons	500 thousands (approx)
2.	Affected villages	4,200
3.	Severely affected villages	over 300
4.	Persons injured	4,463
5.	Number of dead persons	over 900
6.	Number of missing persons	5,748
7.	Number of pukka (solid and permanent) houses damaged	2,679
8.	Number of kuccha (crude or raw state) houses damaged	681
9.	Number of animals lost	8,716
10.	Number of roads destroyed	2,302
11.	Number of bridges washed away	145
12.	Number of drinking water schemes damaged	1,418
13.	Number of villages without power	3,758

Source: Chopra (2014), p.14.

The performance of the state has been below satisfactory to tackle natural disasters and mitigate recurrences even after creating State Disaster Management Authority (SDMA) in 2007. The role of state has been severely criticized by Comptroller and Auditor General (CAG) of India in dealing with such disasters. CAG report clearly brings out the fact what in follows “The performance audit of disaster management revealed State Government’s lackadaisical approach towards implementation of important aspects of disaster prevention, mitigation and preparedness. The State Government had yet to frame the guidelines, policies and rules as envisaged in the Disaster Management Act, 2005. Further, the State Disaster Management Authority was virtually non-functional since its inception in October 2007” (CAG, 2010). Clearly, disaster management never formed a part of development agenda in the state nor the disaster information system proved to be reliable and remained highly inadequate. Lack of disaster preparedness resulted in flash flood in mid June 2013 in upper reaches of the state had primarily due to unprecedented 72 hours rain across the Himalayas. Despite the fact that India Meteorological Department had issued warning about likely excessive rainfall in the affected areas but it was not taken seriously. This was serious laid back approach towards effective and efficient prevention of disaster by the state government.

## **VI. Issues Relating to Rehabilitation and Recovery**

It has widely emerged from the field study that relief and rehabilitation has been carried out in a scrupulous or hasty and perfunctory manner that has not substantive impact on the ground. It is argued that prevention is often possible and also cost effective and effective prevention requires positive role of government and institutions. In any case, relief and monetary compensations are

short term palliatives and therefore the recovery process is critical for sustainable development and reconstructing livelihoods.

In the first place, it is necessary to restore the infrastructure (houses, roads, culverts, bridges, irrigation channels, schools, health centres, community buildings, communication infrastructures, cultivable land etc.) on priority basis. Infrastructure is lifeline for hill people, owing to hill specificities, and without rebuilding and restoring the infrastructure providing livelihoods to people will remain a distant dream. Therefore, development to usher in restoring infrastructure must remain an overriding priority in the medium term. It will be extremely useful to use technology and material that is compatible to hill specificity in view of its fragility. For instance, constructing eco-friendly and disaster resistant housing and other infrastructures needs to be taken up without compromising bio-climatic specificities. Green buildings to green roads by using cold mix technology, for instance, are an innovative experience in Assam. This technology is a remarkable option to solve the problems of road connectivity in view of heavy rainfall.

#### *(i) Roads*

Restoring road connectivity has been a major challenge to reach remote areas. Despite initial hiccups, the Government of Uttarakhand with the assistance from Central Government and World Bank put enormous resources to rebuild roads and bridges. The connectivity has been re-established to almost all the affected villages. However, the quality of roads is another worrying issue which has been built in hurry and urgency. At some places roads are very close to rivers which are likely to be washed away with rise in river water. Construction of safe roads farther the river banks and using green technology is nowhere on the cards. There is a debate whether border roads should be built/handed over to public works department (PWD) of the state government or should remain with border road development organisation (BRDO). Local people firmly believe that handing over of border road development and maintenance to PWD would allow creeping in of corruption, in which local politicians and government officials are actors. The experience of PWD maintaining roads in the state is far from satisfactory as compared to BRDO. Road and building construction activities is coming up in a big way along river banks (Alaknanda, for instance) that is worrying factor for its sustainability and endurance without considering fragility aspect of the region and adhering established building code and norm. There is a need to relook these aspects within the policy framework of mountain economies that are essentially fragile and delicate and susceptible to frequent disasters.

#### *(ii) Shelter*

In case of shelter losses, construction of new houses designed and financed with the support of the World Bank is gradually picking up. People are satisfied with the type of design and completion linked release of assistance for house construction. However, the major problem is the shortage of masons for the construction of houses. In some villages non-availability of land for construction of house at a safer place is becoming a major hurdle. The scheme also allows flexibility of construction of house in any part of Uttarakhand provided that land is in the name of beneficiary of the scheme. However, many of the affected people do not want to build their houses far from their villages. This has slowed down the progress of new house construction. Some of the households have also taken the advantage of the scheme and migrated to Dehradun.

### *(iii) Livelihoods*

In this catastrophe, a huge agricultural land of about 20,000 hectare have been washed away affecting over 50,000 households across over 4, 200 villages. This disaster also washed away over 13,634 cattle/livestock excluding 6,333 poultry. Similarly, there has been immense loss of other livelihoods options associated with the tourism industry such as hotels, lodges, restaurants, *dhabas*, shops, tiny-enterprises, *jajmani* occupations to Kedarnath temple, porters and transporters which have been either completely or considerably eroded and made the lives of people vulnerable and weak. The magnitude of loss of the tourism related livelihoods in the Kedar valley and other religious shrines can be gauged from the fact that the number of tourists approximately increased by 155 per cent during last one decade in the state. Alone 28.4 million tourists visited the state during 2012-13, most of them being religious tourists. There were about 70000 tourists stranded in Kedarnath and Badrinath valleys on the day of disaster. Related to tourism, the number of registered motor vehicles in Uttarakhand increased phenomenally from 83,000 in 2005-06 to 180,000 in 2012-13. Construction of livelihoods is an important strategy to speed up recovery process in the disaster affected districts. There is need to expand further MNREGA to 200 days in a year per family and also need to consolidate and expand scope of works and to be linked with other developmental schemes. Uttarakhand Livelihoods Improvement Project for the Himalayas (ULIPH) or Aajeevika is being implemented in 3 disaster affected districts (namely, Bageshwar, Chamoli and Uttarkashi) and it should be implemented in other 2 districts (Rudrapur and Pithoragarh) covering all the villages affected by disaster in order to benefit directly from expanded livelihood opportunities, increased income and greater economic security.

## **VII. Way Forward**

It is widely emerges from the field study that relief and rehabilitation has been carried out in a scrupulous or hasty and perfunctory manner that has not substantive impact on the ground. It is argued that prevention is often possible and also cost effective and effective prevention requires positive role of government and institutions. In any case, relief and monetary compensations are short term palliatives and therefore the recovery process is critical for sustainable development and reconstructing livelihoods.

In the first place, it is necessary to restore the infrastructure (houses, roads, culverts, bridges, irrigation channels, schools, health centres, community buildings, communication infrastructures, cultivable land etc.) on priority basis. Infrastructure is lifeline for mountain people, owing to mountain specificities, and without rebuilding and restoring the infrastructure providing livelihoods to people will remain a distant dream. Therefore, development to usher in restoring infrastructure must remain an overriding priority in the medium term. It will be extremely useful to use technology and material that is compatible to mountain specificity in view of its fragility. For instance, constructing eco-friendly and disaster resistant housing and other infrastructures needs to be taken up without compromising bio-climatic specificities. Green buildings to green roads by using cold mix technology, for instance, are an innovative experience in Assam. This technology is a remarkable option to solve the problems of road connectivity in view of heavy rainfall that often puts impediment in the construction and maintenance of roads (Papola, 2014).

In this catastrophe, huge cultivable lands have washed away and witnessed enormous loss of animals that has made the livelihoods options sparse. There has been immense loss of other livelihoods options in which people were engaged in, such as household and tiny-enterprises, small

shops, roadside *dhabas* (restaurants), *jajmani* (service castes) occupations to Kedarnath temple has been either completely or considerably eroded and made the lives of people vulnerable and weak.

In recent years, the intensive construction activity resulted in hugely excess carrying capacity thereby destabilizing eco system of fragile region. This has been further aggravated by upcoming of number of hydro-electric projects, large scale construction of dams, roads, tunnels, buildings, towers, ropeways, tanks and other public utility works and indiscriminate mining and quarrying activities that have disturbed the equilibrium in the mountain region which has never been witnessed earlier. Huge construction in the form of houses, shops and lodges has come up near the bank of river in the region that has been cleared by local authorities and district administration with all necessary facilities like water and electricity. Neither building codes nor guidelines for regulating the building construction is being followed in the construction activities. Large numbers of hydro-electric projects are coming up and tunnels are being dug across rivers disregarding the fragility and eco system of the region. Surprisingly, even after such magnitude of disaster construction activities continuing in such fragile locations. One can notice these activities being carried out by Larsen & Toubro (L&T) and Lagadapati Amarappa Naidu Company (LANCO) companies. Recently, Supreme Court panel headed by Mr. Ravi Chopra has recommended that no new hydro projects should be started in the state till the cumulative impact assessment is done for the projects already developed or being developed on local ecology and environment (HT, 2014).

The rehabilitation and reconstruction is primary task of state government with a view to bringing the normalcy to the lives of people that requires a short, medium and long term strategy and action plans.

#### ***(i) Short-term measures***

The immediate relief is critical for saving lives though evacuating people in safer places and providing necessary help in terms of food, water and medicine. In most cases it is experienced that delay in immediate relief resulted in huge loss of lives (human and well as animals) which could have otherwise been averted though immediate provision of relief. One of the reasons is that occurrence of such a catastrophe does not forewarn nor do we have technological wherewithal to assess such disaster in advance. However, in the case of recent disaster, India Meteorological Department had issued warning about likely excessive rainfall in the affected areas but it was not taken seriously. The other reason is delay in providing the rescue and relief measures to the people as warranted by the disastrous situation. The later reason is attributed to human factor that can be surmounted with efficient administrative set up and institutional mechanism. However, the mountain terrain and inaccessibility makes it somewhat difficult to reach instantaneously to the far flung disaster affected locations. This inevitably leads to ponder and act in all seriousness to evolve medium and long term strategy of development within the framework of mountain economy.

#### ***(ii) Medium term strategy***

The disaster brought the enormous loss of livelihoods, entitlements and sources of income in the affected locations that made the people threatened and vulnerable. The massive loss occurred along with devastation of infrastructure that made the people crippled and incapacitated for life.

##### ***a. Infrastructure***

It is necessary to restore the infrastructure (houses, roads, culverts, bridges, irrigation channels, schools, health centres, community buildings, communication infrastructures, cultivable land etc.) on priority basis. Infrastructure is lifeline for mountain people, owing to mountain specificities, and without rebuilding and restoring the infrastructure providing livelihoods to people will remain a distant dream. Therefore, development to usher in restoring infrastructure must remain an overriding priority in the medium term. It will be extremely useful to use technology and material that is compatible to mountain specificity in view of its fragility. For instance, constructing eco-friendly and disaster resistant housing and other infrastructures needs to be taken up without compromising bio-climatic specificities. Green buildings to green roads by using cold mix technology, for instance, are an innovative experience in Assam. This technology is a remarkable option to solve the problems of road connectivity in view of heavy rainfall that often puts impediment in the construction and maintenance of roads (Papola, 2014).

#### *b. Livelihood*

Uttarakhand mountain region is characterized by subsistence agriculture and cultivation is done on terraced type fields which has obvious limitations to expand its land-based activities. Mountain agriculture is an integrated activity that combines with that of animal husbandry, land and forest resources. In the last catastrophe, huge cultivable lands have washed away and witnessed enormous loss of animals that has made the livelihoods options sparse. There has been immense loss of other livelihoods options in which people were engaged in, such as household and tiny-enterprises, small shops, roadside *dhabas* (restaurants), *jajmani* or service occupations that have been considerably eroded and made the lives of people vulnerable and weak. In particular, on *yatra* (journey) route the devastation was indeed enormous. Thousands of people lost their livelihoods who were solely dependent on service related occupations (performing ceremonies and rituals), operating small *dhabas* (restaurants), lodges, motor transport, animal transport (ponies, horses) and palanquin on their shoulders for carrying people. It becomes unlikely to restore the huge livelihood losses in the short run in view of colossal devastation occurred that will take long time to bring back normalcy.

It becomes important to restore and generate livelihoods in agriculture and non-agriculture sector in the medium run. When cultivable land is washed away and cattle's are dead then it becomes extremely difficult to restore cultivation and animal husbandry related activities in the short run. It will take long lead time to initiate such activities through bringing more land under cultivation; if available in the original locations or by relocating them in other areas where land is available that could be brought under cultivation.

#### *(iii) Long term measures*

Huge damage caused by the disaster has profound adverse bearing on social and economic infrastructure that is critical for reviving of agriculture, industry and services. The route to reviving the economic activities is often guided by usual development strategy neglecting the regional specificities (Papola, 2014, Chopra, 2013). Long term measures essentially looks in to the mountain development framework for sustainable development that harmonizes the environment with that of social and economic development. The main reason behind this is disregarding the mountain perspectives which have been defined as “explicit or implicit consideration of specific

mountain conditions and characteristics and their operational implications while conceiving, designing, implementing and assessing interventions in mountain areas” (Jodha et al., 1992).

Planning Commission has eloquently recognized that “the Himalayan region has a very fragile geomorphology and provides valuable ecosystem services to the nation in general and to the people living in Indo-Gangetic Plain in particular. Therefore, sustainable development ought to be central to developmental activities in this region. This is essential to maintain a balance between environment and economic development while striving for faster and inclusive growth, as also emphasized in Twelfth Plan document” (Planning Commission, 2013). Despite the clear recognition of symbiotic relationship between environment and development, the region suffers from ill effects of so called indiscriminate development causing enormous loss to the region.

*(i) Utilization and management of natural resources*

State is supposedly having advantage in terms of hydro-electricity, forest resources, horticulture, tourism & amenities and other mountain-specific products (such as fruits, vegetables, flowers, medicinal plants, seeds etc.). However, many of these activities could not be developed primarily due to lack of appropriate development strategy. It has been commonly observed that there has been unscrupulous exploitation of forests, mining and water resources that has had serious implications to the ecology and environment. Government policies, large development projects and commercial interests, implemented without taking into account the environmental aspects, have also added to environmental degradation. All these factors have serious repercussions on the sustainability of environment and on the livelihood of mountain population.

All this is leading to various kinds of disasters in the state in the form of landslides, earthquake, flash flood, cloud burst and drought etc which is directly related to environmental disturbance that has strong influence on human living. It is, therefore, argued that resources should be optimally managed by community taking in to consideration the conservation, management and recycling aspects. This is expected to lead a sustainable development and management of resource use and activities, even though with low productivity and low pay-offs. There is need for capacity building of community and local bodies of governance, with strong institutional foundation, regarding utilization, conservation and regeneration of resources. Alongside, suitable environment monitoring mechanism needs to be developed and regularly be implemented for every project and program.

*(ii) Environment friendly infrastructural build up*

There are evidences of large infrastructural projects (dam and hydro-power projects, mineral exploration, for instance) have come up or coming up in the region disregarding the fragility and associated environmental hazards. Also, owing to lack of linkages (ancillary activities) in such projects, most of the benefits (water, irrigation facilities, power etc.) have flown to the lowland areas without making major improvements in highland agriculture and other non-agricultural activities. Timber is being the most important forest produce from the point of view of commercial purposes, cutting of trees by the unscrupulous traders and contractors or even by the government agencies have taken a heavy toll on forest resources. Upstream damage as a result of reckless deforestation severely affected the downstream habitats as well (e.g., floods). The recurrent disasters like flash floods, landslides, cloud-burst & excessive rainfall, earthquakes, forest fires and other hazards have been increasing in the mountain economies. Large-scale

unplanned construction activities have serious environmental consequences owing to lack of understanding of mountain construction approaches. Government policies, large development projects and commercial interests, implemented without taking into account the environmental aspects, have also added to environmental degradation (Chopra, 2014). All these factors have serious repercussions on the sustainability of environment and on the livelihood of Mountain population. The interaction between economic growth and natural environment that supports it lies at the core of sustainable development.

As argued in earlier section that infrastructure should be built keeping in view of ecological complexity that allows to constructing eco-friendly infrastructure such as green buildings to green roads, disaster resistant housing and development of environmentally sensitive hydro and other major projects. Environment clearance in terms of its implications must be made mandatory for every project in order to ward off adverse impacts on ecology and bio-diversity.

### *(iii )Agro-climatic suitability for industrial activities*

There are numerous opportunities for development, particularly in the niche segments where the state has comparative advantages and agro-climatic suitability (viz, tourism, power generation, and cultivation of horticultural, medicinal plants and herbs, etc). Enterprise-based activities are critical for sustainable employment generation and enhancing of income levels which in turn can help improving the living standard of the people. Factors like typical mountain specificities (inaccessibility, fragility and marginality), limited and thinly spread resource base, lack of infrastructural facilities, distant markets, low entrepreneurial base, and lack of appropriate policy support severely constrict enterprise-based activities, particularly in the mountain region. Also, ecological and environmental considerations pose acute limitations to the large-scale enterprise development. As a result, entrepreneurial activity is mostly concentrated in the plane districts, which do not have many handicaps that are usually associated with the mountain region.

In the context of mountain region, enterprise-based activity can take different forms – diversification from cereal-based products to high value horticultural products to simple processing, and other enterprise-based activities such as livestock, forest (non-timber), artisan and tourism and amenities services to pollution-free and precision-based enterprises (e.g. electronics).

Such a strategy of mountain development, dovetailing the mountain perspective, will go long for sustainable development that protect against not only reduction in biomass production, occurrences of natural disasters but also guard against marginalization and low human welfare.

An appropriate strategy of mountain development, dovetailing the mountain perspective, will go a long way for sustainable development that protects against not only fast degrading environment and eco system but also helps for faster inclusive development and promotes the wellbeing of people. It is hoped that new government at centre would look in to the problem holistically and find ways and means to work out recovery path from disaster that had badly hit the economy and people of the state.

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