

Report

Socio Economic Assessment of Nature and Impact of Disaster of 2013 on Communities in Pithoragarh, Bageshwar and Uttarkashi districts of Uttarakhand



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Preface

Uttarakhand is multi hazard prone state that is vulnerable to various natural disasters that include cloudbursts, landslides, flash floods, glacial lake outbursts and earthquakes. Causes of this inherent vulnerability of the region are rooted in the evolutionary history and ongoing tectonism. Climate change and reckless developmental activities have further increased the vulnerability.

In the previous some years the state has witnessed a series of extreme climate events, particularly so in 2009, 2010, 2012 and 2013. Flash floods of 2013 inflicted immense loss of human lives, infrastructure and property and Rudraprayag, Chamoli, Uttarkashi, Bageshwar and Pithoragarh districts were worst affected. These extreme climate events and disasters have adverse impact on socio-economic condition of the people and they put an additional pressure on an already strained state economy.

This study is an attempt to capture community's experiences and concerns about hazards and recent disaster event. Understanding community's point of view is essential for developing strategies and plans for disaster risk reduction activities i.e. preparedness, emergency response, reconstruction, rehabilitation and mitigation. Carried out in 45 villages of four remotest blocks, i.e., Bhatwari (Uttarkashi), Munsiyari, Dharchula (Pithoragarh), and Kapkot (Bageshwar), this report tries to holistically characterize individual events that took place before, during and after the disaster of June 2013 in different villages, covered under this research, in their immediate settings, including the hazards, vulnerabilities and nature of their impact on local communities.

This study is envisaged to bring forth awareness amongst masses and policy makers and share the issues faced by community during disaster which needs to be rightly addressed and taken into account in any disaster event in future. We, at DMMC encourage you to share and discuss the results of this study. We welcome comments and queries on his report.

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Abbreviation

ASHA	Accredited Social Health Activist
ANM	Auxiliary Nurse Midwifery
CMO	Chief Medical Officer
CHC	Community Health Centre
DISA	Development Insights for Sustainable Action
DM	District Magistrate
FGDs	Focus Group Discussions
GMVN	Garhwal Mandal Vikas Nigam
HEPs	Hydro-Electric Power Station
IDIs	In-depth Interviews
JCB	Joseph Cyril Bamford
KIIs	Key- Informant Interviews
KMVN	Kumaon Mandal Vikas Nigam
MGNREGA	Mahatma Gandhi National Rural Employment Guarantee Act
MoEF	Ministry of Environment & Forest
NRHM	National Rural Health Mission
NH	National Highway
PRA	Participatory Rural Appraisal
PHC	Primary Health Centre
PRI	Panchayati Raj Institution
PDS Public	Distribution System
SDM	Sub District Magistrate

Executive summary

Changing hazard landscape and recent catastrophic events—in 2010, flood in Bhagirathi; in 2012, flood in Asiganga, and in 2013, ‘the Himalayan tsunami’, as termed by contemporary chief minister of the state,—are stark reminders of the need of bringing hazards, risks and vulnerabilities at the core of development agenda. An evidence based approach to hazards and risk mitigation essentially requires in-depth understanding of vulnerabilities and social significance attached to human losses and socioeconomic disruption during and after such extreme events. However, disaster research is inherently a multidisciplinary exercise as the physical part of the picture is inevitably reconstructed at community level and expressed through their experiences. Again, from a systemic point of view, it becomes important to understand the various elements and factors which construct the disaster as an event and contribute in characterization of individual incident or situation. This report tries to holistically characterize individual events, took place before, during and after June 2013, in different villages, covered under this research, in their immediate settings, including the hazards, vulnerabilities and nature of their impact on local communities.

Extensive media coverage of human loss and sufferings, pictures of the unprecedented damages to buildings and structures under the torrents of rivers, especially in Mandakini valley, generated an enormous ‘information impact’ on affected people, concerned agencies and people across country. News of Kedarnath tragedy reached instantly to pilgrims stranded between Bhatwari and Gangotri and generated tremendous fear and mental shock among them. However, at many places, especially in Pithoragarh, villages situated near river bed, e.g., Neeru and Sobla (twine villages jointly called New Sobla), Ghattabagar, etc., actually succumb to disastrous force of whirling water. Unusual rains triggered moderate to massive landslides in most of villages, as per their local geological susceptibilities. Fortunately, local community members were aware of the landslide zones and seasonal characteristics associated with hazards; therefore they were able to take precautionary measures to avoid any risk. However, almost all the villages lost precious patches of fertile land. Death of animals and damages to households were reported only from only few villages. These landslides and flood also hit roads and physical structures outside villages and generated secondary disaster impact ‘roadblocks’. Although many areas of Uttarkashi, Pithoragarh and Bageshwar were used to face such roadblocks, especially in winters, however, this time it occurred earlier and many of them were not prepared for it. Women, children and old aged people suffered the most during trans-impact period of disastrous events and situations.

Many villages were stranded in almost month long roadblocks on various routes and experienced sever disruption in their socioeconomic life. Although loss of apple producers around Harshil was mitigated to some extent due to proactive purchasing by GMVN, however, villagers depended mostly on potatoes for their cash needs suffered severely and could not market their produce in time. These roadblocks had also disrupted essential services including health and education system. Trends increased outmigration and shifting children to cities and towns for studies have been reported from many affected villages, especially where there has been a trend of such events during past few years. However, worst impacts have been reported by communities solely depended upon tourism and related activities, hotels, shops, restaurants, travel, etc. State has suffered a massive economic shock as tourism& allied activities form a major portion of economy. Severity and scope of the impact of this disaster have highlighted the need to revisit the approach towards hazard mitigation and emergency response along with other development priorities. A decentralized approach to mitigation and emergency response with innovative use of technologies would help address the key gaps.

Chapter 1

Introduction

June 2013 has been inscribed, permanently, in the history of young Uttarakhand state along with the memories of millions across the nation. Huge number of death tolls, accounts of human sufferings and the extent of overall disruption caused due to this mega disaster sharply distinguished it from previous events. A total of 5748 people were officially declared dead, 4,463 were injured, over 5 lakhs people directly or indirectly affected. Many of them stranded without food and water for several days. Similarly, roads were destroyed at 2302 locations, 145 bridges were washed away, making a large part of the state inaccessible for several months. Around 1418 drinking water schemes were damaged. A total of 2679 pukka and 681 kaccha houses were damaged in 4200 villages. Around 20000 hectares of land was destroyed and 8715 animals were killed in this disaster. Similarly, 3758 villages suffered severely due to damages to power supply. These were few of the statistics showing the overall impact of the disaster in the state. Contemporary chief minister of the state coined the term 'Himalayan tsunami' to describe the events of June 2013. However, beneath the load of these statistical figures, the mountainous communities of Uttarakhand suffered at various levels. Social, economic, mental and physical sphere of their lives suffered immediate and sustained impacts of these events. This research tries to explore the nature and foot prints of these impacts. Again, major focus of researchers, media and concerned agencies was in and around Mandakini valley. Affected areas of Uttarkashi, Pithoragarh and Bageshwar were more or less ignored. Therefore, it was important to understand the nature of events took place in other districts, especially Uttarkashi, Pithoragarh and Bageshwar.

Geographical Areas Covered

A total of 45 villages of four remotest blocks, i.e., Bhatwari (Uttarkashi), Munsiyari, Dharchula (Pithoragarh), and Kupkot (Bageshwar) were covered in this research. Research team visited 41 villages out of 45 as it was not possible to reach totally disconnected Pillang (Uttarkashi) due complete damage to passage to the village. Discussions and interviews with community members of Pillang were conducted at Jaurav. Once they heard that a team of researchers had come to get information regarding their problems they could not stop themselves. They crossed the dangerous patch of landslide to see us. Similarly, villagers from Kutti, Napalchu and Budhhi (Dharchula,) had comedown to Dharchula (due to their seasonal migratory pattern) and other places, due to advent of winters. Few interviews with community members of these villages were conducted at

Dharchula. Following table shows the full list of villages, covered under this research, along with respective river valleys.

Valles and blocks	Villages
Uttarkashi (Bhatwari)	
Upper Bhagirathi	Markonda, Mukhwa, Jhala, Bagori
Middle Bhagirathi	Bhatwari, Barsu, Kujjan, Malla, Bhelatipri
Pillangad	Silla, Jaurav, Pillang
Asiganga	
Pthoragarh	
Jauhar Valley and Goriganga (Munsyari)	Senar, Pyankti, Dhapa, Jimia, Quiri, Papri, Madkot and Ghattabagar (Dharchula)
Darma Valley and Dhauliganga (Dharchula)	Tejam, Khet, Sobla, Neeu,
Kali (Dharchula)	Buddhi, Kutti, Napltu
Bageshwar	
Pinder	Kharakiya, Khati, Wachham
Suryu	Khaibagar, Cheerabagar, Gasi, Reethabagar, Pothing, Karmi, Monal, QuiGasi
Rewati	Sama

Table: 1- valley wise categorization covered villages

Key issues enquired and objectives

Extensive field visits were conducted to explore the nature and forms of individual events, e.g., floods, landslides and cloudburst. Efforts were made to capture the exact happenings, immediate impacts and community's reconstruction of the same along with their immediate responses. Secondary events or situations triggered by primary disaster agents, i.e., heavy rains, flood, landslides, etc., were also deeply explored. Community mapping & transect walks were conducted and semi participant observations were made at the main event site to understand their physical aspects, frequencies and past histories. Participatory timeline exercises were conducted to get into the constructs of history of past events formulated into the 'social times' of local communities. However, main focus of the research was on getting holistic and in-depth understanding of socioeconomic life of local communities along with mapping of disruptions, brought about by physical events. This research also collected information regarding typical geographical and hydrological hazards and seasonal nature of the risks associated with them. Following three objectives formally guided the research processes;

- Understanding the nature and forms of disastrous events took place in June 2013
- Mapping immediate impacts of the disastrous events of June 2013 and consequent extreme situations afterwards.
- Exploring long term impacts disasters events of June 2013 on community
- Give recommendations for effective mitigation and early response system

Methodology

Extensive review of available literature including previous researches, journals, and other published materials was done to collect relevant information for enhancing understanding on key issues. Primary focus of this research was on capturing the reconstruction of the physical events and their impacts on local communities. In order to capture the full range of experiences of various sections of local communities, qualitative research tools, e.g., FGDs, IDIs, observations, applied and administered in participatory setting. PRA tools such as mapping, seasonality and timelines were extensively used during discussions. A brief description of sampling and various research tools used in this research is given below.

Sampling: As nonrandom sampling method do not provide enough space for open ended nature of qualitative research, selection of villages and participants for the research processes were made on the basis of purposive sampling method which provides space to select samples as per the needs of the research and related topics. Both male and female participants of two age groups (18-35 and above 35) were involved into research process for capturing wide range of possible experiences and opinions.

In-depth Interviews (IDIs): Unstructured or in-depth interviews (IDIs) are sometimes called life history interviews. This is because they are the favored approach for life history researchers. In this type of interview, the researcher attempts to achieve a holistic understanding of the interviewees' point of view or situation. This research rely heavily on the information collected through forty eight IDIs were conducted in three districts.



Photo

: 1- IDI being conducted at Gasi

Focus Group Discussions (FGDs): Focus group discussions provide information regarding opinion and dynamics of groups formed on the basis of homogenous attributes. Most important aspect of the information captured by FGDs is the points of agreements and disagreements within the group on important issues. Twenty four focus group discussions were conducted separately with males and females in three districts.



Photo: 2- FGD at Papdi

Key informant Interviews (KIIs): Key informant Interviews provide expert opinion and information on any specific issues. Selection of key informants was done on the basis of purposive sampling to capture wide range of information and remarks. A total 30 KIIs at community, districts and state levels were conducted under this research to capture

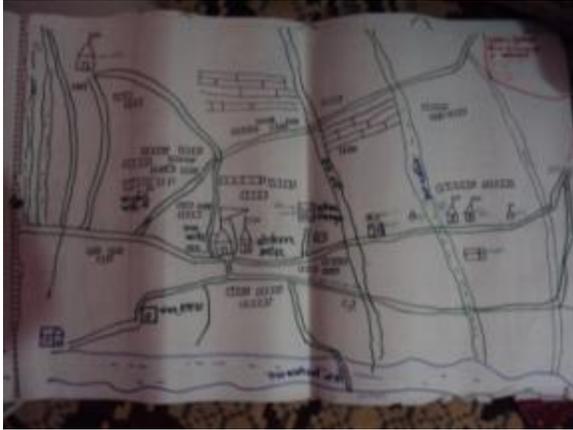
opinions and information from experts in different areas.

Observations: Semi participant observations of affected areas and their visible characteristics were made. Landside, flood sites were visited by field researchers. Information through observations was recorded by camera. Community descriptions of events were recorded and transcribed.

Community and Resource mapping: Community mapping and resource mapping were conducted in each village, visited in three districts. Mapping was done to understand the local geographical context of hazards, vulnerabilities and impact of disasters and their social constructs in the minds of participants.

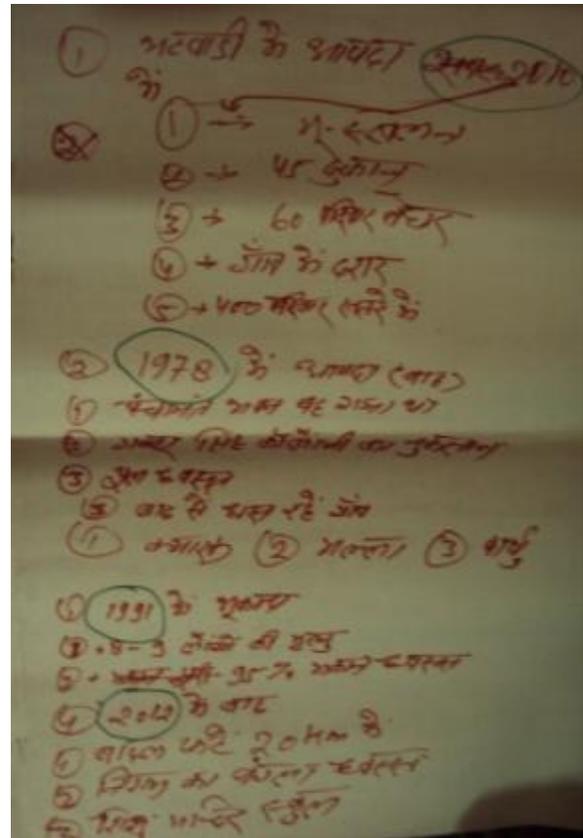


Photo: 3- Participatory Mapping



Seasonality: Seasonality is a very effective PRA tool to analyze the seasonal nature of the hazards, risks and events. Seasonality also highlighted various coping mechanism in respect to challenges associated with different seasons.

Timeline: Timeline is an important PRA research tool which used primarily for capturing 'social times' and their constructs in combined consciousness of local communities. This tool brings the participants into an analytical frame of mind and facilitates them to compare and evaluate past events or times along with related attributes with present. Timeline is an effective tool to capture experiences and opinion of community members based on their past memory. It is possible to explore communities construct of past through by effective use of timeline.



Chapter 2: Hazards and Vulnerabilities

Overview

Current research is primarily focused on mapping the extent, scope and intensity of the impacts of unusual physical events triggered by extreme rainfall experienced over a major portion of Himalayan region, during June 2013, and consequent creation of emergency situations which disrupted social and economic life of the villagers in selected areas of Uttarkashi, Pithoragarh and Bageshwar districts. However, due to its multi-disciplinary and collaborative nature, any disaster research cannot ignore the physical side of the events, as Tierney et al., (2001:22), a sociologist, maintained; *“a more comprehensive perspective are needed that consider both disaster events and broader structural and contextual factors that contribute to disaster victimization and loss.”* In this chapter an effort has been made to briefly characterize the events in their holistic settings to understand their comprehensive nature and forms. Some events and situations demonstrated their uniqueness while others were lined up in arrays of bigger patterns. However, one commonality among hundreds of individual events took place in different areas of the state, lie in the fact that primary trigger behind each of them was early (around 15 days) and unprecedented high rainfall over entire region. Different valleys in Himalayan region have typical geological, seismic, lithological and hydrological susceptibilities which are always ready to welcome such a potent trigger for banging the valleys. Susceptibilities of different valleys, villages and entities, e.g. roads, buildings, dams, etc., against different kinds of hazards are also important factors to understand the sequence of physical events and their potential to create and intensify the emergency situations. However, we can draw a pattern in context of susceptibilities of different villages and entities, and correlate them with actual physical occurrence. Another angle of understanding the physical side of the events lies in the analysis of their history and frequency, in a particular region.

A. Physical vulnerabilities:

Houses and public buildings in the villages situated along with roads, and big structures, e.g., bridges, dams are vulnerable to geological and hydrological hazards. Many researches and reports conducted on hazards and vulnerabilities in Himalayan region pointed towards developmental activities, seismicity and loss of forest cover as the major destabilizing factors which increased the

physical vulnerabilities of many important places and structures.

Road construction techniques: It was reported from many places that most of the landslides occurred during the road cuttings had turned into the major sliding zones. Most of the respondents of FGDs and IDIs conducted during field visits were of the opinion that blasts and use of JCB machines are the primary reasons which destabilize the mountain's load and slop

balance. Similar opinion was also expressed by few officials. Mr. Rawat, Project Manager of Swajal, Bageshwar, said; *“huge load of mountain had taken thousands of years to maintain the balance between slop and load. However, use of JCB machine for road cutting has greatly destabilized this balance as it cuts the surface in 90 degrees. Earlier cutting was done manually and more carefully, however now contractors do not care much about instability and damages.”* Similar observation was made by Mr. Joshi, a state level forest official; *“they live there or not but villagers demand for motor roads. We do not have sustainable technologies to cut the mountains for roads. Furthermore, most of the roads are constructed at lower altitude making them vulnerable to floods. Again, constructions of roads at foothill destabilize the slope and create platform for slides and related problems. We maintain many pedestrians rout in remote areas across the state, as we have to go into the most interior areas. These routes are built at higher altitudes so they are sustainable. Even, these routes were used by villagers stranded during roadblocks.”*

Role of HEPs: Many reports pointed towards the technologies used for construction of HEPs and consequent destruction to forest cover and natural environment as the major factor which are increasing the hazard vulnerability in fragile Himalayas of Uttarakhand. Most of the projects out of 450 HEPs (current, under construction and in pipeline) are diversion projects which divert the water from natural streams to powerhouses, through tunnels. Many reports suggest that technologies used in the construction of such tunnels may cause destabilization and destruction in internal water streams and storage. Community members in many villages such as Kujjan, Barsu, Agora and

Bhankoli blamed explosion as the primary region for destabilizing geological balance in their area. *“Although it is closed now, but ever since this project (Logari-Nagpal) had started in our area, everything had damaged in our village, our agricultural production, water, land, everything;”* said a participant in Kujjan village. Similarly, one young male shared in Agora; *“our village was very good, income and livelihood was thriving due to huge tourists’ inflow to Dodital. However, this project has damaged natural environment, and slides started to occur only since then. Now we lost our livelihood, there is no tourist inflow, especially after flood (in 2012).”* It was also reported by many villagers that they were experiencing the problem of seepage of water from their houses since the construction of HEPs started in their areas. A committee formed by Ministry of environment and forest (MoEF), after directives of Supreme Court, to assess the role of HEPs in Uttarakhand disaster of June 2013, has found clear links between catastrophic events and construction of tunnels and dams. The ministry report has also highlighted the damages caused to natural resources of the state due HEPs. Furthermore, it was also suggested by many reports that changes in moisture level at specific place after accumulation of huge amount of water might have played important role in destabilizing altitude-moisture-temperature balance in fragile mountain valleys.

Deforestation: Deforestation has also increased the physical and social vulnerabilities in hilly areas. Around 65% of the total land in the state comes under the forests; however satellite imageries point towards a huge reduction in the actual forest cover. Communities traditionally preserved forests in Himalayan region as it provides safety against many hazards, e.g.,

flashflood, slides, avalanche and rock falls. Research team observed that many villages had preserved forest cover, especially above the residential areas. Villagers in Mukhwa, Uttarkashi, informed that dense forest right over the village have saved the houses many times from avalanches, flashflood and rock falls. One old aged resident of the village shared, *“we do not cut trees in this jungle as it saves our lives. There were many occasions in past when this jungle had saved us from flashfloods and avalanche. It also provides safety against rock fall.”* One FGD members in Agora said; *“our village is vulnerable to rock fall, flash flood and avalanche as we could not save our forest above the houses. Now our houses are exposed to different kinds of physical event.”*



Photo: 4- Destruction of way to Agora

Modern building architecture: Impact of modernity in context of architecture and design has enhanced the vulnerabilities of physical structures against the impact of unusual events. Moreover, observations made during field visits suggest that households, bridges and other structures built on the principles of traditional knowledge and with local materials were

capable of sustaining the impacts of earthquakes, floods and other events. We would discuss the vulnerabilities of modern houses and traditional resilient architecture in next section as this topic is related more with the risks to human lives and social vulnerabilities. One of the major challenge mountain communities face during rainy season is the obstructions caused due to damages to rural roads, and bridges. Examples of Shilla, Jaurav, Pillang, Agora, Bhankoli, in Uttarkashi, villages in Pinder valley in Baheshwar, villages around Tejam (Darma Valley), Senar, Pyankti, Jimia and Quiri in Pithoragarh are among the most affected in this respect.

Plight of villagers in Pillang:

Research team conducted interviews and FGDs with community members of Pillang in Jaurav village as the only path to reach there was completely damaged. Pillang is completely alienated from rest of the world when landslide, as previous slides damaged the only path to Jaurav. When research team could not reach the Pillang after various attempts to cross a major landslide site, villagers came to Jaurav, by climbing without safety equipment to share their experiences putting their lives under enormous risk. It was reported that quality of education in Pillang is good and therefore many children of Jaurav go to study there. Many children cross the deadly patch of landslide while going to school.

Bridges over rivers and streams provide vital services and safety to local population, especially in hilly areas. However, a total of 145 bridges across the state were damaged during 2013. This figure had exposed the vulnerabilities of these structures against extreme events. Most of these bridges were made on the basis of modern technology and

materials. However, it was reported by local residents and further reinforced by observation made by research team that old hanging bridges survived the impact of extreme events during 2013. Research team also observed that wooden bridges made by local community at many remote places, as a response to the extreme events. These bridges were built on the basis of traditional knowledge, and local physical & human resources. Many such bridges were effectively serving the local communities, as witnessed by research team during field visits in three districts. Most important example was the speedy construction of Jauljeevi Bridge by Nepali counterparts for facilitating the historic fair Dharchula region. SDM of Dharchula shared; *“Can you believe they took only two days to build that wooden bridge. No costly materials, no engineers, they used locally available materials and built in only two days to surprise us.”*



Photo: 5-Newly constructed Jauljeevi Bridge on Kali River

Encroachment near river: Another factor which has increased the vulnerability of structures, properties as well as human lives against flood is the tendency of common people to encroach into places near to roads and rivers. Similarly

markets, towns and human settlements mushroomed on roadsides, and near the rivers, due to the booming tourism industry, in recent times. Disastrous events which took place in Mandakini valley and at Madkot, in Pithoragarh, Bhatwari, Ganganani, and in main town of Uttarkashi are clear examples of hazard vulnerabilities of such places. At many places construction work, especially under HEPs have caused growth in old settlements and establishment of new ones, near river flow. Such settlements are extremely vulnerable against floods. Total wash out of Sobla, Neeu, and Ghattabagar in Pithoragarh are examples of vulnerabilities of such settlements against flood.

Climate change and variability: In depth analysis of the data collected by many agencies suggest that climate change is taking place more rapidly in Himalaya than many other regions. This change is depleting the natural resources along with sustainability of tourism based economy of the state. However, a major concern which has increased the physical and socioeconomic vulnerabilities in Uttarakhand is climate variability. For last few years there are evidences of change in the pattern, timing and intensity of rains and temperature. Extreme events took place during June 2013 was largely attributed to climate variability.

B. Social vulnerabilities:

Human side of the vulnerability is equally important to understand the holistic nature and dynamics of disastrous events. Impact of modernity and efforts to extend the development models of plains, into the hilly region have made the social and economic life of mountain communities vulnerable.

Negligence towards age old hilly passages:

Many participants especially from Dharchula, Pinder Valley and some places in Uttarkashi, shared that during most extreme emergencies during 2013, many people used age old hilly paths for reaching nearest towns to address their immediate needs. One participant of FGD in Khet, Pithoragarh shared; *“we used hilly high attitude short cuts to reach Dharchula during long blockage in 2013.”* It was shared by many community members in Bageshwar and Pithoragarh districts that their ancestors had extensive knowledge of local geography and they used high altitude shortcuts to quickly reach up to Haldwani. However, complete dependency of local communities on modern roads has decreased in their knowledge of local geography and it has led to disappear many such valuable higher altitude passes and paths. Although, as shared by a state level official, forest department maintains many such old paths to manage far stretched forests. Sufferings of local communities during sustained roadblocks in many parts of the state, in 2013, can be better understood in the context of decreasing traditional knowledge regarding local geography, sustainable practices and a tendency to abandon hilly shortcuts.

Non sustainable technology and architecture:

Another factor which enhances the vulnerabilities of local population is the increasing tendency of adopting non sustainable modern technologies for house constructions, especially in hazardous areas. Cost of constructing such buildings in hilly areas put local people under enormous economic pressure and makes the households more vulnerable during extreme events. Research team observed that most of the damaged buildings in Bhatwari and other villages were made of cement, iron and bricks. One the other

hand, traditional wisdom and local technologies enhance the reliance of the structures, households as well as entire community against extreme events. Villagers in Jhala, Mukhwa and Markonda in Uttarkashi, showed many such old building. It was shared by them that these structures had survived numerous earthquakes and were still standing at their places. Research team also witnessed many such age old traditional buildings in all three districts.



Photo:6- A hundreds of year old traditional house in Mukhwa, Uttarkashi which survived several earthquakes including 1991

Similarly, damages to school buildings and hospitals built on the basis of modern non-sustainable technology, as happened in many villages during 2013, cause severe disruptions in the life of local people.



Photo:7- A Damaged School in Khet

Poverty and unemployment: Poverty and lack of employment opportunities are at the center of the plight of mountain communities. It reduces the socioeconomic resilience of communities against disasters and emergency situations. Official state level data suggest that speedy economic development of Uttarakhand have been concentrated mainly in four southern districts. Sharp regional differences can be seen, if we compare various development indicators of nine hilly districts with that of four southern ones. It can be clearly understood that mountain communities in Uttarakhand have been denied of their share in economic growth of the state, which are mostly based on unsustainable exploitation of natural resources of hilly regions. This disparity coupled with poverty and unemployment has been manifested in large scale of out migration from the villages. Such tendency is even clearly visible in the villages which are not located near any places of high tourists' attraction. *"There is nothing in our village, only agriculture, that too, provides limited income as transportation cost for marketing the output is very high;"* said the village panchayat head of Silla, Uttarkashi. Research team observed very limited young male population in remote villages such as Jimia, Quiri, Senar, Pyankti in Pithoragarh. One young male in Khet, Dharchula have shared; *"Madam, nothing is here, this YarsaGumba have saved our lives, otherwise we would have indulged ourselves into fighting, and snatching food and other things from each other."*

Collection of Yarsagumba or Keedajadi

Collection of Keedajadi, is one of the newly emerged livelihood source to local communities in Pithoragarh and Bageshwar. They get good sum of money in very short time due to this. However, it was reported

from many villages that going to high altitude meadows, close to glaciers were extremely dangerous during rainy season when ice start melting at that altitude. High level of casualties, reportedly take place during collection of Keedajadi, every year. Casualties reported from Tejam (Darmaghati), Pithoragarh in June 2013 were linked to Keedajadi as victims were returning down to their homes when they succumbed to torrent of a mountain stream.

Change in Demographic nature of hilly population: Out migration have changed the demographic nature of the villages in the hilly areas. Research team has observed that most villages, especially in remote areas, were occupied by age old people and women. One old person in Jimia shared; *"old aged people are left in this village, our children have been shifted to cities for education and young people out migrated for employment."* One interesting correlation between outmigration and increased frequency of extreme events lies in the fact that both have been intensified during last 10-15 years. Young people form the frontline in responding to emergency situations. Village panchayat head of Agora shared; *"villagers were shifted to their Chhannies (cattle shelters at high altitude) during June 2013 as our villages face problems due to enormous water seepages during rains. When the flood intensified in June we found ourselves disconnected from our main settlement where we had kept storage of essential supplies. During this time, young people and boys of our village, trained in tracking and mountaineering due to existence of similar kind of tourism here, used their skills and transported ration and essential items from houses to chhannies, with*

the help of trekking ropes. Otherwise we would have starved to death.”



Photo: 8- Group discussion at Kujjan, Uttarkashi

It is well understood that changes in the demography have weakened the capacities existing population to effectively respond to and take actions during emergencies. These changes have enhanced the vulnerabilities of existing population against extreme events. Absences of young males in the villages where high level of outmigration has taken place left women as the dominating part of population. Although, it is well documented fact that women in Uttarakhand play dominant role in harvesting and other agricultural practices, however, during extreme situations only men are required to respond to physical impact of the events. It was also reported from few places, e.g., Quiri, Barsu and Bhelatipri, that when rural routes turned extremely dangerous, only men were deployed to take the children to schools and bring them back to homes.

High work load and pressure on women: They collect fuel and fodder from jungle and even

fetch water from nearby water sources, in hilly region.

Besides, normative stereotypes of gender roles and related household responsibilities, e.g., cooking, taking care of children, put them under extraordinary daily schedule related mental and physical exertions. Unusual events and extreme conditions enhanced pressure on them along with increasing risks and vulnerability. It was shared by participants in many villages, e.g., Bhelatipri, that fetching water, collecting fuel wood and extended pressure to take care of children during stretched school vacations put women under enormous mental and physical strain. It was reported that they fetched water from rivers when it was dangerous to go near them.

Health needs of pregnant women:

Furthermore, health needs of pregnant women put them under extreme vulnerability in remote areas where health situation is poor. Extreme situations and emergency conditions, e.g., roadblock, etc., further enhance their vulnerabilities.

Children: Children are also vulnerable against extreme events as they have to pass through dangerous patches of landslides and flooded areas, to reach to schools. Furthermore many school buildings are vulnerable to extreme events, e.g., earthquakes, landslides, avalanches and rock falls. It was informed by villagers of Dhapa, Pithoragarh that the school building was abandoned due to a major rock fall in 2012. Similarly, one fatal landslide killed 18 students in Sumgarh village, Bageshwar, in 2010.

Chapter 3: Characterization of Extreme Events During 2013

Overview

Characterization of extreme events and emergency situation which is created afterwards would provide key insights regarding the nature of events and their impacts on communities. Kreps (2001: 3718) mentioned following entry in latest edition of the *International Encyclopedia of the Social and Behavioral Sciences*, defining the disasters; “Disasters are non-routine events in societies or their larger subsystems (e.g., regions and communities) that involve conjunctions of physical conditions with social definitions of human harm and social disruption.” Above mentioned definition which is more and less accepted by most the scholars and experts stressed on following three major constructs for distinguishing routine events from disasters; (i) These are not routine events, (ii) Physical conditions (event), and (iii) Conjunctions of physical conditions with human harm and social disruption (in context of social significance of such harms and disruptions. Based on these criteria it can be said that most of the physical events and consequent situations occurred at various places during June 2013 and afterwards fall in various categories from merely augmentation of previously existed difficult conditions of local nature to extreme disastrous events causing severe human harm and social disruption to a significant level. However, if we ignore the individual characteristics of various events which took place in different areas and focus on the compound situation emerged at state level, then it can be termed as one of the most severe disaster with potential of leaving a permanent footprint in the history of state (and of nation as well) as well as in the ‘social times’ of local communities.

Characterization of individual events:

Elements of demarcating the disastrous events practices by experts’ of disaster management across the world focus on following elements;

- Frequency
- Predictability of the event
- Length of forewarning
- Controllability
- Magnitude of primary impact
- Scope of impact
- Duration of impact

Controllability of high magnitude physical events, e.g., landslide, flood, etc., are far from the realm of possibilities, keeping in mind the low level of resources and technological

options, available at local levels. It was found that most of the landslides took place at various places, were massive in their impacts with less forewarning. However, past history and predictability regarding place and time (season) provided enough scope to local communities to avoid human loss due to landslides. On the other hand, floods in Goriganga, Dhauliganga, Asiganga (2012), Pilangad and Middle Bhagirathi region nearly surprised affected communities with less predictability (especially about magnitude) no controllability, and with shorter forewarning. Therefore events of floods, and cloud burst had brought enormous damages to affected communities, especially of vulnerable sections. Incidence of cloud burst and its timing (after midnight) in Khaibagar village of Bageshwar, in July 2013, did not give any chance to an unfortunate family. Four

members were died in this fatal incident. Similarly, Socio economically vulnerable population of Sobla, Neeru (Darma valley) and Ghattabagar suffered far deeper than comparative well of community of Madkot in Pithoragarh.

Frequency of events and their **predictability** provide important insights to local communities for formulating the responses and developing coping mechanism. Sustainability of human societies in fragile Himalayan region has been attributed to such coping mechanism and traditional wisdom. '*Seasonal migration*' of Bhotia tribes of Bagori village in Uttarkashi can be seen as an example. Furthermore, most of the areas in higher Himalayas in Uttarkashi, Pithoragarh and Bageshwar become disconnected during winter seasons as transportation is halted due to heavy snowfall on roads and passages. Local communities store ration, fuel, fodder, medicines and other essential things as a specific form of coping mechanism to address the emergency situation. A detailed list of disastrous events and their impacts are given in the tables-1, 2 and 3, and attached to this report as appendix.

A. Disruption in road transportation:

Many highways in the Uttarakhand are vulnerable to extreme climatic condition, mainly to heavy rainfall. Due to increase in the intensity and shift in the timing of rainfall, damages to roads and consequent cut offs have taken a seasonal characteristic in hilly areas of the state. Chardham Yatra route which includes, NH 108, NH 58 are among the most vulnerable routes. Very heavy rainfall during June 2013 triggered landslides on vulnerable spots on highways and roads all across state. At many places floods washed away large patches of roads. Official report showed that a total of

2042 km roads were damaged in the state during June 2013 events. Similarly, at least 145 bridges were damaged during the same period.

Disruption in Uttarkashi: NH 108 was severely damaged and traffic was closed between Rishikesh to Harshil for several days. Whereas, a major segment of the NH was repaired and traffic & transportation between Uttarkashi and Rishikesh was recovered within few weeks. However, section between Uttarkashi and Harshil, took almost three months for final restoration. Thousands of pilgrims were stranded between Bhatwari and Harshil for many days till they were airlifted to safer places. It was estimated by an employee of GMVN that around ten thousands pilgrims were stranded only at Harshil. Villages from Bhatwari to Harshil were also stranded in this long stretched duration of blockage, with less supply of ration and essential items. Most affected villages include; Mukhwa, Markonda, Bhatwari, Kujjan, Jhala, Bagori, Barsu, Malla and Bhelatiperi. Similarly, road between Sangamchatti and Uttarkashi town was also severely damaged and remained closed for over three months. Flood in Bhagirathi and Asiganga was the primary agent which brought destruction to roads and bridges. Villagers from Agora, Bhankoli and Gajoli were cut off from Uttarkashi and suffered due to lack of essential supplies. However, it was found that emergency response by government agencies brought some relief to affected people. Water, food, medicines and essential items were dropped by helicopters, in affected villages. Pregnant women and severely injured persons were airlifted to hospitals in Uttarkashi and Dehradun. Similarly, students stranded in villages around Harshil, due to summer vacations, were airlifted to Uttarkashi and Dehradun, where they stayed for studies.

Disruption in Pithoragarh: Accounts of community members suggested that major part of highway, from Munsiyari to Dharchula in Pithoragarh, was washed out due to flood in Gorigana River. Madkot, Jauljeevi, Ghatabagar, and other villages situated on this road were stranded with fewer supplies, for months. Kailash Mansarovar route was also severely damaged, alienating many villages situated along Kali River, in Dharchula block. Village experienced worst condition due to roadblocks was situated on Dhauliganga River and in Darma valley, in Dharchula. Neeu, Sobla, Khet, Tejam were among the worst hit village in this areas. Flood in Goriganga, Kali and Dhauliganga was the primary factor which caused destruction to roads on multiple points. It was found that government agencies responded quickly in this reason to mitigate the impact and restore the conditions to normal level. Helicopters were used to drop essential commodities in the villages. Pregnant women and patients were airlifted to hospitals in Dharchula.

Disruption in Bageshwar: It was reported that Pinder valley area in Kapkot block was also severely affected due to sever damages to road ant multiple points. Although it was reported that villages situated above Song towards Pinder and Kafni glaciers experience roadblocks every year, however, heavy rain during June 2013 impacted more severely that previous years. Major villages stranded in roadblocks were Khati, Kharakiya, Wachham, Karmi and Pothing. It was noted that flood was not the primary agent which caused destruction to roads in Pinder Valley, Bageshwar.

B. Floods

Floods, flashfloods and cloudburst are the most devastating form of climate induced extreme

events. Traditionally, communities in Himalayan region, avoid making their settlements near the river course. This was the only coping mechanism practiced to avoid the wrath of mighty Himalayan. However, extraordinary focus on tourism led commercialization has led people to breach the traditional wisdom by settling near the river course, on roadside. Loose implementation in building regulations, in context of construction in hazardous areas, had further encouraged this trend during recent year. Rivers and their tributaries in the state experienced enormous load of flood under unusually heavy rainfall during June 2013. Mountain streams turned into torrents and devastated the vulnerable patches of land and settlements. Vulnerable places situated at higher altitude experienced augmentation in landslides. However, villages and roads situated close to riverbed were severely damaged.

As mentioned above, NH 108 and road from Sangamchatti to Uttarkashi town, highway from Munsiyari to Dharchula and from later to Darma Valley, in Pithoragarh, were severely damaged due to devastating flood in respective rivers. It was found that Bhelatiperi in Uttarkashi, Madkot, Ghatabagar, Neeu and Sobla in Pithoragarh were the worst hit villages, visited under this research. it was reported that conditions in Bhelatipri turned threatening after heavy flood in Bhagirathi river. Situation was further complicated with months long disruption in road transportation due to damages to NH 108. Bhatwari and Malla were other villages affected by flood to some degree.

Damages in Pithoragarh: Madkot, a commercialized village situated on the road from Munsiyari to Dharchula, experienced sever jolt as many building constructed at road side collapsed into Goriganga River, causing

enormous economic impact on villagers. It was reported that most of the buildings collapsed, were multistoried structures of commercial nature, e.g., hotels, shops, etc. Data collected during this research pointed towards the fact that owners of these buildings also had other houses located at safer place in the same village. It was found that no life threatening conditions emerged in Madkot, during 2013. Ghattabagar, a village situated near Goriganga was severely damaged due to flood. Social and economic life of the village was completely disrupted. All the houses were washed away by devastating flood in Goriganga. Situation further complicated with the outbreak of diarrhea due to intake of polluted water. It took at least 5-6 days for concerned agencies to reach into the village with initial support. However, effective response from concerned agencies saved lives of villagers. It was observed by research team that villagers were still residing in the same temporary shelters, till the time of field visit. One more village which was close to Dharchula suffered similar impact due flood in Goriganga river. Worst hit villages covered under this research were Neeu and Sobla (jointly called New Sobla) in Dharchula region. Both villages were completely washed out due to flood in Dhauliganga. It was reported that Neeu and Sobla, jointly had 400 houses.



Photo: 10- A site of Sobla were around 400 HH were washed away due to flood in Dhauliganga

Both villages were situated close to each other at the river bed and were vulnerable to floods. When research team visited there, only two damaged houses were found at the original site. Although impact of the flood in both villages was fatal however no human causality reported, mostly due to the reason that entire population had gone to higher altitudes to collect Yarsagumba (Keedajadi). Only few people were left in Sobla and Neeu with responsibility to take care of animals. However, when sudden flood came, early in the morning, it did not give enough time to these persons to unleash the animals. It was reported by local people that residents of these villages were shifted to other places by local administration.



Photo: 11- Landslide caused due to flood at the Sobla

Research team also observed the site, at Sobla, where heavy landslide was triggered after devastating flood in Dhauliganga.

C. Landslides:

It was reported and observed that most of the landslide spots (reported in 2013) were previously identified and were far from residential areas. It gave enough predictability to local communities, regarding the affected locations. Again past experiences had taught them about the season, timing and other

physical factors associated with these slides. These factors provided enough insights to communities for formulating responses against such events. Most of the villagers Senar, Pyankti, (Pithoragarh), Silla, Jaurav, Agora, Bhankoli, Kujjan and Barsu (Uttarkashi) shared that they moved to their Chhannies (cattle shelter) situated at higher altitude before the rain took place, reducing the risk due to possible landslides.

Huge landslides took place in villages situated near Pillagad, Asiganga Rivers in Uttarkashi, Jauhar Valley (Munsiyari), Darma Valley (Dharchula) in Pithoragarh and in some areas of Kupkot block, Bageshwar. It was observed by research team that almost all these events took place on previous landslide spots in villages. No evidences of totally new slides were found from anywhere. There was no report of any human causality due to landslide occurred in affected villages visited by research team. However, landslides generated fear among local communities and damaged agricultural land in most of the villages. Although houses were damaged in very few villages, e.g., Quiri and Jimia (4 abandoned structures, most of the households were damaged in 2010) in Pithoragarh, however, community members were aware of the dangerous spots and evacuated the vulnerable area.



Photo: 12- A massive landslide between Jaurav & Pillang

Other villages affected by landslides were Pillang, Jaurav, Bhankoli and Agora in Uttarkashi. Landslide caused difficulties in Silla, and Jaurav, villages of Uttarkashi can be seen as the augmentation of previous slides. However it turns disastrous in Pillang with complete disruption of social and economic life of community members. Massive landslide between Pillang and Jourav was the augmentation of the slides of previous years along the great seismic rapture occurred during 1991 earthquake. Similarly slides in Agora and Bhankoli were also augmentation of previous slides caused due to construction work of HEP and flood in Assiganga, during 2012.



Photo: 13- Huge landslide caused due to flood in Asiganga valley

With only exception of Jimia (Pithoragarh) landslides in other villages occurred mostly outside residential areas. It clearly indicates towards the wisdom of the local communities, in selecting the safer place for settlements.

At many places, e.g., Barsu, Kujjan, Agora, etc., community members reported sinking of land. Both agricultural land and residential areas were reported sinking. Most of the participants of FGDs and IDIs in such villages were of the opinion that construction of HEP, blasts for tunnel construction and faulty road cutting by

JCB machines were responsible for the sinking. Pothing in Bageshwar, where a cloud burst killed several people few years back experienced landslides at the same point. Although landslides were not fatal, however, they brought damages to agricultural land, water sources, forests and road.

It can be said that landslides took place inside the villages did not create alarming situations (with exception of Quiri, Jimia and Pillang) with disruption in normal life of villages. However, on the other hand, landslides occurred outside village during 2013 were emerged as the major factor which brought disruption in road transportations along with hardships to affected people.

Chapter 4: Immediate Impacts

Overview:

Unusual rainfall during June 2013 triggered floods and landslides at many places in three districts causing extensive damages to properties, households, and agricultural lands. Infrastructure related to power supply, drinking water, roads and bridges were damaged in many villages along with disruption in mobile network. Structural impacts in villages ranged from moderate to severe depending upon respective hazard vulnerabilities. Places which had experienced floods and slides during 2010 and 2012 witnessed augmentation in the previous impacts. Responses collected from the villages suggest intensity of rainfall itself had created an atmosphere of fear, uncertainty and shock almost everywhere. Women, children and old aged people suffered most due to their relatively higher vulnerabilities. Furthermore, this situation of uncertainty and shock was followed by disconnection due to roadblocks causing shortages in essential supplies and socioeconomic disruption as per distribution of vulnerabilities across villages.

A. Damages to human life and animals:

No incidences of human casualties were reported from 45 villages covered under this research, except from Khaibagar (Bageshwar) and Tejam (Pithoragarh). Former incidence took place late in July 2013 when a cloud burst killed four persons of one family sleeping, during midnight. The incidence reported from Tejam (Darma valley, Pithoragarh) killed several persons (number not validated) when they were trying to cross the inundated river. Animals were killed in many villages, e.g., Bhelatipri, Ghattabagar, Sobla, etc. The terrific incidence which took place at Sobla, Pithoragarh, was described by a villager during FGD in following words;

"No, there were no human casualties but all the cows, bulls and other animals along with houses and shops washed away in the flood. On 16th June 2013 we experienced heavy rainfall since 11 o'clock morning. I was stranded at Darma that time. I could not reach, however I had got this information that Sobla, Kanjoti, Tawaghat, Yelakot, Bulakot, all these were completely washed away."

B. Damages to households other structures and land:

Damages to households were reported from only few villages. Primary disaster agent in these villages was flood during 2013. These villages included, Madkot, Neeu, Sobla and Ghattabagar in Pithoragarh. Entire residential areas were washed away in later three villages, however, in Madkot only those structures (mostly commercial) fell which were situated on roadside. *"There were a total of 400 families living here (in twin villages of Sobla and Neeu called jointly New-Sobla)...and see now everything is clean, no sign. There was a very big village here. Houses, shops, hotels everything is washed away,"* said a person near Sobla. Four to five houses were damaged in Khaibagar, Bageshwar. One female participant of FGD, informed; *"houses of five people were washed away in 2013 when cloudburst aggravated the streams at 2 o'clock in night."* Few houses of Dhapa, Pithoragarh were damaged in 2013. It was reported from many villages of Asiganga and middle Bhagirathi valleys that raptures, appeared in their houses after flood in 2012 and 2010, were widened to

significant extent during 2013. It was reported by villagers that most devastating impact to houses and other structures was felt during the flood in previous years. Heavy rainfall during 2013 amplified previous damages. Similarly around 40 houses were damaged in Quiri, Pithoragarh due to massive landslide in 2010. One old person shared in Quiri; *“there were around 30 to 40 houses here. All of them were damaged in 2010 and families shifted to temporary tin shed. The evidence of remaining houses was cleaned in 2013.*



Photo: 14- Residential area damaged by landslide in Jimia, Pithoragarh

Damages to agricultural land were reported from almost all the villages covered under this report. *“See our village from that mountain and then you can see the size of slide and the area it has damaged in our village,”* Said the village panchayat head of Silla, Uttarkashi. It was reported by villagers and observed by researchers in Bagori, Uttarkashi that a large patch of land (agriculture land and apple farm) was completely washed out by the flood in Bhagirathi River.



Photo: 15- Damages to farm land in Bagori, Uttarkashi

Slides and floods caused severe damages to electricity, and irrigation and water supply infrastructure in many villages. Pithoragarh and Uttarkashi were the more severely hit than Bageshwar.

C. Impact on water resources

Heavy rainfall induced slides and floods had badly affected the sources of drinking water across the state. Major forms of impact included pollution and damages to water supply systems, installed by Swajal and Jal Nigam. As per official report at least 237 drinking water supply schemes were damaged in 1418 villages. However, quick responses from concerned agencies contained the situation to some extent. Ganesh Singh, Dhapa, Pithoragarh, informed, *“Chlorine tablets were distributed to contain the situation. However, I don’t know, had people used them or not?”* Responses of the most of the affected villages across three districts suggest that recovery and repair work of the damaged drinking water projects were initiated after trans-impact period. It was reflected in the responses that most of the villages used natural sources for drinking water, especially during June 2013. Ravinder Singh of

Kujjan explained the situation in following words;

“Our village has natural water sources along with water supply infrastructure built by Swajal. We maintain these sources and pipelines by ourselves. Few of them turned dysfunctional when village was empty as residents moved to their Chhanies (temporary shelter for cattle), especially during June-July. It is a fact that water in natural sources is polluted during rains. However, as our chhanies are located at high altitudes, we have access to the main sources where water is generally pure. Later on Bhuvneshwari Mahila Ashram provided us with filters.”

However, in many villages people were aware that these natural sources of water may get polluted during rainy season. Ganesh Singh, Dhapa, Pithoragarh said; *“see we have main source (mooldhara) of water here in our village. This water source, too, get polluted during July August. If you visit our village during that time you would see it as a huge ‘nala’ (canal) where water from everywhere accumulates.”*

Pollution in drinking water and infections:

Many villages did not have safe natural sources of water, especially those which are situated close to river beds. *“All these taps are new, and water is also purified now. We fetched and drinking water from the natural sources existed at height or collected rains for drinking during that time. Later on we were provided water filters and chlorine tablets for purification. However it took at least 10 days when facilities regarding purification and safe drinking water were established. Till then we faced tremendous difficulties. People were started getting ill after 5-6 days since disaster. Health camps were operational in our village for 6 months as people here suffered a lot due to diarrhea,”* shared a participant of FGD in

Ghattabagar, Pithoragarh.

Problem of drinking water emerged in few more villages in Uttarkashi and Pithoragarh. Bhelatipri, Uttarkashi, is one of the most affected villages in the district. One participant from female group described the situation; *“River was full of debris and mud. We boiled water before drinking them during that time. Initially we filtered water as the color was muddy. Later on we used chlorine tablets, however, they (response agencies) took at least one month to reach to us with tablets, and then only we could use it. However we had no choice left, but to drink polluted water before that. That is why I had to go to Malla for taking medicines.”* Responses from Bhatwari, a village which suffered heavy destruction during 2010, also pointed towards the fact that water supply system is one of the most vulnerable physical structure attached to high level of social and political significance. One participant of the FGD conducted in the village focused on the status of water supply system and their vulnerability against hazards and disasters; *“public taps are the only sources of water we have. However, these taps are generally damaged during disasters and sometimes they remain dysfunctional for months. We fetch water from Gangaji (Bhagirathi) when such conditions emerged. Water in Gangaji is quite dirty and we do not have facilities to filter water. Some people drink the same water after boiling. Some people try to filter it by Chhanni (domestic filter). We maintain and repair these taps by ourselves.”* Similar concerns shared by many villagers across all three districts. One participant of FGD in Karmi, Bageshwar, shared the vulnerabilities of the villagers during rainy season due water pollution in following words;

“People from SWAJAL never visit to see the status of water supply during rainy season. Believe me at least 90% people here get ill during rainy season. You will find that everyone in our village have strains of hepatitis. For last 5-6 years, we are witnessing outbreak of diarrhea, each year. One added factor is that no one goes to see the status of natural water sources in our village, ever since the drinking water pipeline constructed. Consequently many sources are disappeared. Those who are now aware drink water after boiling, but unaware people get ill within a week (in rainy season). Most of the people, especially women and children in our village got ill during that time.”

Information collected during field visits pointed towards the fact that similar situation existed in many villages, e.g., Sama, Wachham, Kharkiya, etc., especially in Bageshwar district. However, at some places community took joint action to construct and maintain the water sources, especially during trans-impact period. Kujjan was an excellent example of social capital and community led response to disastrous situation. One participant of FGD conducted at Kujjan, Uttarkashi shared;

“We managed our needs by maintaining and cleaning the water sources existed in our village. Two to four boys went there (after disaster) and cleaned the sources (natural), and then all of us worked jointly and repaired the pipeline by ourselves. We did not have time to wait for government action. You know, many times, we have repaired our approach road to market. Even we did that during last time (2010) when disaster hit our villages.”

D. Psychological Impacts and immediate responses

June 2013 events was unique in sense that it created enormous ‘information impact’ on

communities, agencies and government. Mr. Mr. Badani, an employee of GMVN, Harshil, shared; *“people started leaving their houses during that time. They had heard of incidences at Kedarnath and feared of same happening here.”* One paramedical staff members of CHC, Bhatwari, shared; *“hundreds of pilgrims visited here each day during that time. Overwhelming majority of them was suffering from acute mental trauma, fear and gastrointestinal infections. Most of them had not eaten properly for many days and they drunk infected water. They had the fear that they would not survive. Although we did not have trainings, however all of us (medical staff) were involved into counseling them.”* Community members in many villages of Uttarkashi and Pithoragarh experienced high level of psychological impact during the peak hours of physical events. It was also reported from many villages that community members gathered at one place and prepared for joint action during peak hours. One female participant of FGD conducted in Bhelatipri, Uttarkashi, shared; *“we all were fearful and we spend complete two days together, cooked and ate together at the temple.”*

Many villagers shared their past experiences of fear during emergency situations. Gajender Singh Rawat of Barsu, Uttarkashi, shared the experiences of community response to a flashflood after cloud burst in 2012; *“people gathered at one place due to fear and decided to stay together and face whatever would happen. We were ready to die together as the sound of the physical events surpassed our imaginations. We thought that water would reach to us within few minutes and would flush us into the deep valley. However, old people of the village assured us and advised to remain calm and*

composed. We did nothing and followed the advice of village elders. There was one woman at that time who started crying due to fear, however our elders managed to calm her down.”

High level of social capital and community response:

Responses from majority of the villages showed that initial response of communities to emergency situations triggered participation and joint actions. It was reported from many villages that emergencies and fear led members to participate in night long vigilance of rains, streams, slide zones, springs and other hazards. *“We kept vigilant and deployed community members to keep an eye on the dangerous slide spots during night. We used to watch the slide zone by torches and lamps, in nights,”* said a participant of FGD in Quiri, Pithoragarh.

Although information of tragic incidences at Kedarnath generated fear among villagers, however, there were many references when such psychological impact triggered positive emotional responses and display high level of social capital. Sushil Singh, Jhala, Uttarkashi, shared, *“there was some problems in two to three families. Two women were pregnant and one person was paralyzed. Then fifteen boys of our village took them to Uttarkashi even when the high way was closed due to destruction.”*

E. Shortages of essential supplies:

Many villages suffered due to sever roadblocks and stranded with less supplies for over months. Community members were not ready for such a long disconnection from urban centers and market. One member of FGD conducted at Kujjan, Uttarkashi shared; *“we*

experienced the shortages of ration and essential supplies for at least one month. Although airdropping by helicopter was a relief, however, we face shortages of sugar and salt. When stock of sugar was ended we put salt in tea. Then stock of salt was also ended.” Similarly, a member of FGD at Bhatwari, shared. *“We suffered such shortages for at least four months. Even we did not have stock of sugar to mix it with milk for feed our children. Shortage of matchbox, salt and other food items was faced by most of the households.”* Emergency response of government brought relief to community members in most of the villages. Mrs. Meera Martoli, Madkot, Pithoragarh shared; *“although we felt shortages in essential household’s stocks, however, dropping of essential items helped us cope with the problem.”*

Change in pattern of storage: It was reported from many villages that communities suffered similar situations during past few years had developed a practice of storing essential items before rainy seasons. These villages suffered less than others. Ravinder Singh of Kujjan, Uttarkashi shared, *“yes we have changed our pattern of storage. Earlier there were blockages due to snowfall in winters. Now rainfalls are more sever and consequently most of the roadblocks are caused due to it. Therefore we prepare ourselves in context of rains rather than winters.”*

High prices: it was reported from many places, especially in Uttarkashi district, that prices were gone higher during trans-impact period of extreme events and roadblocks. However, such hikes in prices were reported, mostly from small rural markets. It was shared by many villagers that few retailers, especially in remote areas, exploited this situation to earn extra income.

One participant of female FGD group in Bhelatipri, Uttarkashi, informed, *“Prices in Malla was very high. Although such hike were, not reported from Uttarkashi (town).”*

F. Impact on vulnerable sections of society:

Extreme events had brought enormous pressure on vulnerable sections of the society, e.g., women, children, old age people and socioeconomically weaker families.

Impact on women: It was reported from many places that women experienced extended workload, physical and mental exertion. They had to collect fuel, fetch water from passages which were damaged and difficult to walk. It significantly increased the timing to complete outdoor tasks. One woman from Jimia, Pithoragarh, shared; *“earlier it took only one hour to collect fodder and fuel from nearby field. But now it takes almost 6 hours to bring that as passages become difficult due to slides. It increased total working hours.”* Such outdoor work put them into vulnerable situations, as reported from many villages. One female participant of FGD in Bhelatipri, Uttarkashi shared; *“river was very dangerous that time and we had to go there for fetching water and washing clothes. It was not only dangerous but also time taking due to damages to path.”* Children remained at home till the schools were closed and taking care of them exerted mental and physical pressure to women.

Impact on children and old age people: Damages to regular passages created difficulties in movement for women, old people and children. Children had to go to schools by the damaged passages.

Impact on laborers: Families depended mostly on unorganized labor suffered heavily during trans-impact period as all the construction and development works were closed. One male participant of FGD at Bhelatipri, Uttarkashi informed, *“we lost employment during disaster as works under MGNREGA were closed for long period.”* Similarly, one participant of FGD in Bhatwari shared, *“we felt the problem for months. Many families are depended on labor and then they are able to earn their meal during night. However, there was no work during that time.”*

G. Impact on health

Deluge and resultant havoc created after catastrophic events occurred in Mandakini valley, put health related concerns of the affected population at the forefront of response and mitigation agencies. Many of the villages in Uttarkashi, Pithoragarh and Bageshwar are situated in remote areas where health services are not effective even during normal conditions. Impact of disaster put many other areas into the same situation. However, effective and quick responses of state government agencies, local administration, civil societies and NGOs contained the situation. It was found that access to medical facilities and health services were significantly cut off in many parts of Uttarkashi, Pithoragarh and Bageshwar. It was reported from many severely affected areas that 108 services could not reach to these places for at least 3 months. However, 108 services were quickly restored to the places with recovery of road connectivity. Further, more damages to communication infrastructure, i.e., mobile network, and disruption in the power supply further augmented the situation in many areas, especially during trans-impact period. As one

state level NRHM official shared; *“our state lack doctors and during the time of emergency we could not provide trained human resources to remote areas. However, with the support of central government and other states we could manage to address the challenges to the extent we could do.”*

It was found that Pithoragarh was the worst hit districts in context of impact on public health, among three, followed by Uttarkashi and then Bageshwar. Deputy CMO of Bageshwar shared;

“There was no noticeable impact of disaster witnessed in Bageshwar. Of course village in Pindar valley had faced some difficulties. There were some damages happened in Kapkot then we shifted pregnant ladies to safe places and hospitals. Some patients were shifted by helicopters. We kept new mothers at our hospitals for 2 months after delivery.”

Health and psychological trauma of pilgrims stranded between Gangotri and Bhatwari was one of the major challenges before government machinery. It was reported that at least 10000 pilgrims were stranded only at Harshil. Many of them were physically shattered and got ill due long disruption in food supply, water and sanitation. One of the health staff of PHC at Bhatwari shared, *“many of them were suffering from gastrointestinal problems. It was shared by most of them that they did not get regular food and water for many days. Although local people supported them with food and shelter, however, number of these pilgrims was too high.”* Another staff at same PHC said, *“Biggest problem we faced during that time was that most of the pilgrims were suffering from acute mental trauma due to fear of death. We did not have appropriate training of handling such problems. We had only one counselor here;*

however, all of us provided extensive counseling to them.”

Major health issues during trans-impact period: Treatment of injured, containing the spread of epidemics, providing medical attention to pregnant women and addressing the issues of mental trauma, in severely affected population were among the immediate health related concerns. Sub divisional magistrate of Dharchula, Pithoragarh shared during the interview;

“we were concerned more about reaching to affected people as you know there were massive slides took place, blocking the road connectivity, especially in Dhauliganga valley. Highway along the Goriganga was also severely affected and several villages suffered heavily...providing immediate medical attention to affected population was the first thing before us...we used helicopters and airlifted affected people”

One person in severely damaged village Sobla, Pithoragarh, shared; *“yes affected people were sent to Dharchula by helicopter...some people were suffering from fever, some with other health problems, and then SDM announced to transport all the patients by helicopter to hospitals.”* Pregnant women and their family members and people with severe health conditions were airlifted to hospital in affected areas. One member of FGD conducted at Bhelatipri, Uttarkashi informed, and *“There was a pregnant woman at that time in our village. We experienced a lot problem in her delivery. We took her to Bhatwari, then Matli and then finally to Mussoorie. Yes, we transported her by helicopter.”*

Medical camps were organized at severely affected areas for providing effective health services to people. Ganesh Singh, Dhapa, Pithoragarh, shared, *“people suffered a lot during last year disaster. Many houses were damaged in this village. However we did not feel any sever problem due to the fact that health camps continued for at least on year.”* Village Panchayat head of Madkot, Pithoragarh said, *“there was no sever health problems in this area as medical camps were organized everywhere and doctors were available in these camps.”* One member of female group at Ghattabagar, Pithoragarh, and a severely damaged village described the effective response of government in following words;

“We received a lot of support from government. Level of arrangements here was more than what we had expected. One medical camp established here and remained functional for 6 months. Actually, people here had suffered seriously by loose motion. I can’t say, what was the region behind this? Many people got ill. Doctors from SSB and army frequently visited here. Actually people started getting ill after 5-6 days since the disaster.”

Grassroots level health situation in remote areas and impact of disaster: One of the major issues was related to ensuring supplies of essential drugs and instruments in interior areas especially during trans-impact period. Although, prompt government response had mitigated the impact in many areas however, few remote villages experienced disruption in supplies and regular health services. One participant of FGD at Kujjan, Uttarkashi said, *“ASHA in our village did not have stocks of essential medicines during the time of disaster.”* Ganga Singh, Quiri, Pithoragarh share, *“There is no role of ANM in our village. She does not come when we call her during the time of need. Therefore we carry the patient down to Munsiyari. Although, there is*

an ANM center in our village, however, she does not come here.” At many places, local community members were not happy with ANMs and existing health services. Such grassroots level health concerns were further deepened during and after extreme events of June 2013. One participant of focus group discussions conducted in Karmi, Bageshwar, expressed his concerns in following words;

“Yes, there is an ANM center in our village. There are 8-9 villages in our village panchayat. ANM does not visit these villages by herself, she has to be brought, mostly by ASHAs then she provides services. There is no problem from their (ASHAs) part. We also have a PHC in our village; however, only one or two people might be visiting there. Even deliveries are also not carried out at the ANM center. We have to go to Kapkot for that. Most of the deliveries are conducted at home in our village. Around 99% deliveries are carried out at home.”

Participants of the focus group discussion conducted in Silla, Uttarkashi were also concerned about poor health services at grassroots level. *“Around 80% deliveries in our village are conducted by maid,”* said a participant of the FGD, in the same village. Similarly, one participant of FGD in Quiri, Pithoragarh shared; *“we take them (pregnant women) to hospital in doli (a type of litter) only when they experience acute pain. Otherwise deliveries take place in our village, sometimes by ASHA.”* Situation in the villages of Pindar Valley in Bageshwar is also very poor. *“No one from our village had reached to hospital during the time of need. Both of my parents died in the way to hospitals,”* shared a participant of FGD in Wachham, Bageshwar. Although extreme events during June 2013 brought difficulties in the lives of such remote villages with poor health facilities, however, responses of community members suggest that they face

similar situation, during most of the year. Silla, Jaudav, Pillang, in Uttarkashi, Khati, Kharkian and Wachham in Pindar valley in Bageshwar, Tejam, Quiri, Jimia, in Pithoragarh are among the important villages where health situation along with other basic needs are way beyond minimum level. Extreme events during June 2013 had further pushed them towards vulnerability.

H. Immediate Impact on Education

Education system was severely disrupted as schools were not opened till situation returned to normal. Scheduled resumptions after summer vacation delayed at state level, as government had ordered to keep the schools closed at least up to one month after disaster. Closure of many schools, especially in highly affected areas, continued till mid-September. Many school buildings were damaged and abandoned, especially in Uttarkashi and Pithoragarh districts. Furthermore, extreme events such as heavy rains, floods and slides had made many school buildings physically vulnerable to disasters. Ganesh Singh, Dhapa, Pithoragarh, shared; *“there was a big rock started falling towards school. Fortunately, school building was saved; however, we don’t send our children to that school and shifted them to Munsiyari.”* It was also observed during field visits that quoted school building was abandoned. Damages to highways, approach roads and bridges made going to school inaccessible in many villages and towns, in affected districts. One young female participant of the FGD conducted at Khaibagar, Bageshwar informed; *“you know intermediate school is at Kapkot. We faced a lot of difficulties due to damages of road at multiple points. Schools were closed up to one month and when children tried to attend the school after that they faced*

problems.” Similarly, one student from Bhelatipri village, Uttarkashi, shared, *“We did not go to school till it was closed. However, after the vacation, we experienced a lot of fear as the passages to school turned extremely dangerous.”*

It was reported from many places that teachers felt problems in reaching to schools after summer vacation. One participant of FGD conducted at Bhatwari, Uttarkashi shared; *“Schools were closed for at least 2-3 months. Teachers do not stay here, they come from other places. Few of them were stranded at their places due to damages to roads.”* It was reported from many affected areas that teachers could not reach to the places after summer vacation to join their duties. Panchayat head of Silla village angrily said, *“They don’t come, they have a tendency to bunk even during normal times, how come they join during disaster. Even that we had ensured them for free ration and other essential support, however, they got an excuse and didn’t come here. Go to school and see by yourself, whether it is running or closed.”* A participant of focus group discussion conducted with the community members in Bhatwari, Uttarkashi, expressed the concerns of villager in following words;

“Schools were functional at the villages where teachers stay. Here in our village, schools remain closed most of the time as teachers don’t come. A simple rain can close the schools so you can understand the situation during disasters. This is the condition of all the schools here, even of the intermediate collage. So teachers saved the educational session mainly due to government’s policy that you cannot fail a student no matter student study or not they have to be passed.”

Sending children to schools was mentioned as the most difficult task after the disaster. This task put parents under enormous physical and psychological pressure. Raj Prakash of Barsu, Uttarkashi share; *"I used to drop children to school at Maneri by going there on foot. It took entire day to drop and bring children from school. At many places community level participatory actions were initiated to address this challenge. "We send at least two mature people along with children to drop them at schools. Women were not sent to drop them as passage was extremely dangerous,"* said a participant of the FGD at Kujjan, Uttarkashi. High level of social capital during emergency situation initiated community action at many places. One member of the focus group discussion conducted at Dhapa, Pithoragarh, shared; *"yes there was problems that time as passage to school was severely damaged. Then we repaired the damaged patches by joint actions so that children could go to schools."*

Effective government response: Effective government response and community support towards restoring education mitigated the impact of disaster on education to a large extent. Mrs. Meera Mertoli, Madkot, Pithoragarh, shared; *"no there was no problem as government had ordered to close the school till restoration of the conditions."* It was shared by community members, especially in the hazardous and inaccessible areas that teachers were hesitant to reach to schools even after resumption of education. One member of FGD conducted in Karmi, Bageshwar, said; *"how could they reach here when the road was highly damaged. Teachers here are useless as it is a common tendency among them to keep themselves away from school and take frequent vacations. No one of them wants to stay here as*

nothing is here. There is no light, no water, who would stay here." However, as shared by official of education department in Uttarkashi, government was keen to restore the education system, as early as possible, to minimize the loss to students. Teachers were ordered to stay at the duty stations, especially in remote and hazardous areas. Ravinder Singh from Kujjan, Uttarkashi shared; *"educational session of students was saved as government had ordered teachers to stay at the duty stations after schools were resumed in September. DM had ordered to close the schools till September. So teachers were instructed to stay in the schools after resumptions and were ensured to provide ration and other essential support at the school."*

Government was so keen to restore the education system that helicopters were used to shift the students from blockade affected areas to towns where they were getting education. Sushil Singh, Jhala, Uttarkashi, admired government's action towards resumption of education; *"There was no loss as when schools were resumed government had announced to airlift children of all the families, by helicopters to their schools (Uttarkashi)." Similarly, Rami Ram, Sobla, Pithoragarh praised government in following words; "They (families) were taken to Dharchula by helicopters and education of the children was resumed. Government took proactive measures for ensuring the admissions of children in the schools of Dharchula, so that their education could not be affected."* Information collected from other areas also reinforced this fact. One participant of FGD conducted in Mukhwa, Uttarkashi said; *"teachers were present here during the time of disaster, however, children who studied at Uttarkashi or Dehradun were sent to their*

relative destination by helicopters, so that their educational session could be saved.”

Indirect impact: It was reported from the worst hit areas in Uttarkashi and Pithoragarh that many families shifted their children from local schools to nearby cities and towns and made residential arrangements for them. Ganga Singh, of Quiri, Pithoragarh, shared; *“all families have shifted their children to Munsiyari for ensuring the quality of their education. Even children going to primary schools were also shifted. Similarly, one participant of FGD, conducted at Agora in Uttarkashi, said; “yes when the roads and passages are closed then you can feel the impact on every sphere of life. Many families in our village have taken rooms in Uttarkashi on rent, to educate their children. Many families have permanently shifted to safer places in plains after the disaster (flood in 2012).*

The need of ensuring education of children, especially in context of disaster, has triggered many families to migrate to cities. One participant of FGD conducted in Bhatwari, Uttarkashi, justified such migration; *“these families have not abandoned (Bhatwari), they have shifted temporarily to ensure non-disrupted education of their children, as schools here are generally closed during disasters. Such regular disruption impact the education of children. Many families migrated to Uttarkashi, few to Dehradun.”* It has been reported at many places that number of students are decreases to student’s migration to cities and towns for study. It was observed that only 13 students were registered in primary school of Mukhwa. Similar situation was observed in Sener, Pithoragarh, where there was only one student enrolled in primary school, during the visit of research team.

Chapter 5: Indirect Impacts

Overview:

Disasters and extreme events cast long term direct and indirect impacts on local communities. Such impacts take different forms and course based on existing social vulnerability. However, vulnerability is distributed unequally across societies, communities, and social groups. Agriculture, tourism and unorganized labor sector provide livelihoods to most of the villagers in these three districts. Information collected during field visits suggest that 'information impact' created by extreme events occurred during 2013 have overwhelmingly impacted tourism based state economy and livelihoods of communities depended on it. Similarly, damages to agricultural land, crops, and transport system have intensified the difficulties of economically vulnerable agrarian communities and augmented the pace of outmigration. Whereas impact on tourism and agriculture are of long term, unorganized rural labor sector recovered to some extent due extensive reconstruction and mitigation activities. We have already discussed about how seasonal nature of risks and disasters and damages to road have forced many families to shift their children to cities and towns for education. This chapter deals primarily on socioeconomic disruption and impact of disaster took place in 2013. Other aspects of long term impacts have been covered in previous chapter.

A. Impact on tourism based livelihood

The fact that around 30% of the GDP of the state comes from the tourism suggests that this sector provides a major source of livelihood to local communities across Uttarakhand. Districts covered under this research have important places with paramount tourist importance. Gangotri and Yamunotri in Uttarkashi district come under the holy *Chardham* circuit whereas Dharchula in Pithoragarh is an important halting point for *Kailash Mansarovar Yatra*. Similarly, *Bagnath* and *Bajjnath* temples of Bageshwar are also famous for its history and religious value. These districts are also homes to some of the most beautiful places with scenic beauty and environmental resources such as glacial lakes, glaciers, peaks, meadows and falls which attract tourists and adventure enthusiasts from all over the world. Dodital Lake, Gomukh glacier, Satopant peak, and various meadows in Uttarkashi, Pindari and Kafni glaciers in

Bageshwar, and Panchachuli and AdiKailash peaks, Milam glacier, and towns like Munsiyari, Dharchula, and Didihat in Pithoragarh are some of the places which attract tourists in huge numbers. Local community members, especially of young generation provide their services as tourist guides and potters. Similarly families having ponies get incomes by providing transport services to difficult routes. Many households in villages are depended upon guest houses and staying services to tourists. Tourism also provides a major source of income to those who are in travel and transportation business. Most of the villages located on highways are commercialized and have developed small markets with hotels and guest houses due to high inflow of tourists. Many villages and places covered under this research, e.g., Harshil, Bhatwari, Malla (Uttarkashi), Khati and Kharkiya (Bageshwar) and Madkot, Jauljeevi (Pithoragarh), etc., have been commercialized, in course of time, due to high tourists' inflow.

Sharp decline in the pilgrims' inflow to Chardham circuit: It has been officially reported that inflow of tourists of all types has been sharply reduced in the state during 2014-15 season. *Chardham* circuit was worst hit this year due to psychosocial impact of catastrophic events, occurred during June 2013. It was found that many families in Mukhwa, and Markonda, villages which were home to priests and guides lost their livelihood due to absolute fall in the inflow of pilgrims at Gangotri for almost 18 months. Kripa Ram Sevak, a priest at Gangotri, Mukhwa expressed the situation in following words;

"Our employment has been heavily suffered. Our livelihood is entirely depended upon tourism. However, tourists are not coming here. It is almost 2 years since disaster, however, its impact are still visible. Pilgrims are not coming and this is the main impact. We are the priests of Gangotri and our livelihood is based on Mother Ganga."

Prem Valabh Badani, an employee of GMVN (Harshil) remarked on the situation, *"Madam Employment of local people has been hit, badly, everyone including shopkeepers, hotel owners, even panwalas (Pan Shop) have suffered a lot."* Similar views were expressed by Patwari (local revenue officer) of Harshil;

"Impact of disaster is that Yatra (holy circuit) is stopped and all the hotels and restaurants situated on the Yatra route are closed. If they do not open their hotel and start earning then what would they eat? And (similarly) livelihoods of the priests of Gangotri are also threatened, as this is the only source of income they have. So this is a big question and this is the problem."

Indirect Impact of decline in tourists inflow to Gangotri has also been felt by families in other villages, e.g., Jhala, Bhatwari, Dharali, Malla,

etc., situated close to National highway 108. These families depended mostly on hotel and restaurant business in their respective villages. They have suffered heavy losses due to lack of business. Members of a male group conducted at Bhatwari village, which is situated at least 50-60 km away from Gangotri, estimated the number of families depended on holy circuit. One member of the group summed up the estimation, *"at least 35% families of the village depended up on Gangotri, remaining 65% earn their livelihoods from agriculture or labor.* Madan Singh of Jhala village drew a picture of how families depended upon Gangotri have suffered;

"We are experiencing huge impact this year as Yatra (Chardham circuit) could not be started. Those who have purchased hotels here have suffered heavy losses. As you can see here all the hotels are closed only one or two shops are running here where all the necessary items are available."

Decline in adventure & nature tourists' inflow: Majority of responses from different villages suggest that number of adventure and nature seeking tourists have also registered sharp decline. Majority of responses from residents of Agora, Bhankoli, and Gajoli, where most of the families earned their livelihoods by Dodital and meadow based tourism, linked this decline with the disaster caused in the Asiganga valley in 2012. However, disaster in June 2013 has further aggravated this situation. One participant of FGD conducted with young male group in Agora described the situation in following words;

"Our village lies in the route to Dodital, however, tourism in our village is finished, in reality, for last 2 years. (Earlier) Some people had shops, now the impact is clear. We have around 140 families in the village

out of which only 5 percent are depended on jobs/services, rests are based on farming which has turned useless due to slides. Fortunately our children were involved into tourism. And now that too is finished."

In charge of forest guest house in Agora village shared, *"many families of this village have become unemployed after the flood of 2012 as tourism related to Dodital is almost closed."* Similar downfall has been experienced by many families in Barsu village of Uttarkashi, where livelihood of many families was based on the tourism related to famous Dayara Bugyal (Meadow). *"You cannot imagine how crowded this place had turned during tourist seasons. Half of our village earned their income directly or indirectly from Dayara. This year, as you can see, no one is here. This is the impact of disaster on us,"* said, the owner of Dayara Resort, Barsu.

Similar experiences were shared by hotel and guest house owners in Munsyari, the ice-city in Pithoragarh, famous for the view of Panchachuli range. Hayat Sing, owner of a hotel in Munsiyari confirmed that inflow in the city is decline after June 2013 events, *"we have experienced downfall in tourists' inflow and so in our business."* An Employee of KMVN guest house at Dharchula shared, *"sir this (Dharchula) is an important halt point on the route to Kailash Mansarovar. This town was always filled with tourists. And our guest house remained occupied during most of the time. However, this year is exceptional as most of the rooms of this guest house remained unoccupied even during peak season."*

Pinder and Kafniglacier related nature based tourism in Bageshwar has also experienced decline however; responses suggest that this decrease is not as sharp as witnessed in Uttarkashi and Pithoragarh. Hotel and guest

house owners in Khati and Kharakiya village confirmed decline in the number of tourists. Danu, the manager of a guesthouse at Kharakiya said, *"Yes there is some impact as we have received slightly less number of tourists this year."* After a comparative analysis, it can be said that Uttarkashi has suffered the worst impact of disaster, due to fall in tourism, followed by Pithoragarh. Impact on tourism in Bageshwar is not as sharp as in other two districts. However, a huge jolt has been felt on tourism sector at state level during 2013-14 and 2014-15. According to an estimate (PHD Research Bureau 2013) there has been an astronomical loss of Rs. 120 billion to tourism sector in the state during 2013-14 which is projected to increase up to Rs. 200 billion during 2014-15.

B. Impact on agriculture based livelihood

Although agricultural in Himalayas are broadly characterized as sustainable farming, however, it provides core nutritional input to local communities along with supplementing their income with cash crops and horticulture. Potato, red kidney bean, amaranths form the major cash crops along with horticultural produces such as apple. Apple production is concentrated mostly in and around Harshil region in Uttarkashi. Residents of most of the villages covered under this research depended largely on income from the production of cash crops such as potato and red kidney bean. However, extreme events during June 2013 (and in 2010 and 2012 at some places) have impacted the agriculture in various ways.

Loss of and Damages to agricultural land: Almost all the villages covered under this research experienced damages to land and crops. Villages such as Silla, Agora, Bhankoli,

Bhelatipri, Malla, in Uttarkashi, Ghattabagar, Khet, Sobla, Neeu, Madkot, TallaDhapa in Pithoragarh and Khati, Khaibagar, Cheerabagar, Reethabagar, Gasi, Sama, and Karmi in Bageshwar districts are among the important village which lost fertile agricultural land due to floods. Major chunks of land near river beds, in these villages were washed away by the whirling water. Similarly, Jaurav, Pillang, Bhankoli, Agora, in Uttarkashi, Jimia, Quiri, Senar, Pyankti, Khet, Tejam (nearby villages), in Pithoragarh and Gasi, Pothing, and Karmi in Bageshwar districts are among important villages which lost agricultural land due to landslides, debris flow, cloud burst and torrents of mountain streams.

Low productivity of key agricultural produce:

Participants of FGDs and IDIs in many villages, affected by heavy landslides, expressed their experiences regarding loss of productivity and attributed it to the damages to fertile top soil. Such experiences were reported from Quiri, Jimia in Pithoragarh and Barsu, Kujjan, Bhankoli, Agora in Uttarkashi. Ganga Singh, from Quiri, Pithoragarh expressed shared his experience and related concerns in following words;

“For last four to five years we witness sharp decrease in agricultural production. We work hard in farms but production remains at low end. Earlier our production was very good but now it is nothing. When the fertility of our land has been washed away then how will productivity be improved?”

Similar concerns shared by villagers of Kujjan and Barsu in Uttarkashi district. However many of them could not trace the exact reason for decrease in the production. One participant of the FGD conducted with male group in Barsu village shared his experiences of sharp decreasing in the production of red kidney bean;

“We do not sell Rajma (Red kidney bean) as our production has gone way down to what it was earlier. For last two to three years our production has gone down. Now we have to purchase it for our own use. Now it is difficult even to retain the seeds if we try to cultivate it.”

Similarly, Gajvender Singh Rawat of the same village (Barsu) was puzzled with the reasons behind the sharp decrease in production of Rajma (red kidney bean) after the disaster and said;

“We don’t know what has happened since disaster took place, production of red kidney bean has gone way down. One factor we witnessed is unusual high rainfall. And second fact is that the plants of red kidney bean do not grow to their full length.”

However Participants from Kujjan, Uttarkashi, correlated low productivity in agriculture with construction of hydropower projects (HEPs) in their vicinity and subsequent damages to environment. One participant of the male group has expressed his conclusion holding Lohari Nagpala Power Project responsible for the damages to the village;

“No matter the Lohari Nagpala project is closed but it has brought enormous damages to our village. Ever since they conducted blasting here our village started suffering in various ways. Earlier our village was very good in every sphere however since the start of this project nothing is happening here. No cereal, no other thing.”

Another participant from the same group explained this statement in following words;

“What he has said is right, the dam construction started in 2004. We have witnessed decrease in the production since then, neither red kidney bean, nor potato or amaranth, nothing is happening here. We do

not understand what has happened to our crops. Besides this, our houses started rapturing since the start of the project.”

Residents of Barsu, Agora, and Bhankoli also blamed HEPs for their plight. One participant of male group in Agora, Uttarkashi, shared; *“our village witnessed a devastating flood in 2012. Ever since the construction work, related to dam project, started, we have witnessed a continuous series of landslides in our village.”* Similar emotions were shared by residents of Khet and Sobla villages, in Pithoragarh.

Repeated damages to road and impact on marketing of cash products: Timing of these events disrupted transportation and marketing of potato to markets. Destruction to roads and highways completely isolated many villages from cities and markets. Responses of farmers in many villages of the Uttarkashi, e.g., Silla, Jaurav, Agora, Gajoli, Bhankoli, Kujjan and Barsu suggest that potatoes could not reach to market, in time, due to destruction of highways. Huge amount of potatoes were wasted and thrown away in these villages. Extreme events during June 2013 damaged NH at many places and consequently transportation was completely closed for at least for forty days. Even after that only partial transportation was resumed. Potatoes produced during June were reportedly wasted, even in villages which were well connected by motor road. An agricultural official, at Bhatwari confirmed the same. Gajvender Rawat of Barsu, Uttarkashi shared about his experiences regarding this,

“Our major cash crop is potato which is produced twice in a year, once in June and second time in October-November. Last year, we could not send our production of June due disruption in transportation and damages to roads. Although road transportation was still not smoothly

opened during October November, however government had purchased major portion of our produce at that time.



Photo: 16- Women harvesting in Barshu

However many villages, e.g., Silla, Pillang, Jaurav, Quiri, Jimia, Wachham, etc., face chronic problem of connectivity throughout the year. One participant of focus group discussion conducted with males in Silla, Uttarkashi shared their plight in following words;

“Employment in our villages means only agriculture. We do not have approach road. Our potatoes were wasted and thrown away due roadblock caused by damages to motor road.”

Disruption in marketing of apple: Similarly apple producers of villages nearby Harshil faced similar problem due to extreme situation of road blockage in 2013.



Photo: 17- A woman of Bagori, Uttarkashi carrying apples to market

Apples could not be transported to markets. Contractors could not reach near plantation to collect the produce. Furthermore, high level of moisture created adverse conditions for their storage. Apples of many villages were nearly destroyed. However, state government's quick response towards this problem brought relief to producers.

State government quickly instructed Garhwal Mandal Vikas Nigam (GMVN), to purchase apples from producers at Rs. 30/kg.

Purchase of apple by GMVN

Prem Valabh Badani, an employ of GMVN, Harshil shared about how apples from producers purchased as mitigation measure:

"Here situation worsened after road blockage, almost 10000 pilgrims were stranded between Harshil and Gangotri. We all were going through enormous pressure due to this specific problem. In meantime, we were instructed to purchase all the apples from producers, as a measure to minimize their losses. We opened our temporary purchasing centers at important places in this valley. We purchased apples flatly at the rate of Rs. 30/kg. We could not transported them outside the valley as road blockage continued for 40 days and event after that transportation was restored only partially, as highways was not appropriate for heavy vehicles. It took at least 90 days for full recovery of the road transportation. So we had to dispose of all the purchased apples. We also purchased apples of very poor quality on the same rate and then threw it as this measure was directed to give villagers some relief.

witnessed even a bigger and more devastating disaster during 2012, did not cultivate potatoes during 2013-14. One male shared his experience regarding disastrous events which took place in the valley in successive years; *"we are discouraged as agriculture is not profitable in our villages due to damages to road every year. Such events are happening every year and 2012 was the peak. This year also the road from Sangamchatti to Uttarkashi destroyed.* Similarly a female from Bhankoli village said, *"We stopped cultivating potato as we do not have roads and means to send our produce to market. Road from Sangamchatti to Uttarkashi is inundated every year. Even we do not go to Sangamchatti as approach road from our village is completely damaged during 2012 and this year it turned even worst."* Her account was justified on the same day as field researchers had gone through a life threatening experience while passing through a long stretch of landslide on the way from Bhankoli to Sangamchatti.



Figure 4 Researcher passing through landslide hit approach road to Bankoli

Discouraged villagers stopped cultivating potatoes in some village: Many villagers, especially in Asiganga valley where they had

Chapter 6:

Response, Gaps and Recommendations

A. Emergency Response, mitigation and recovery:

Search and rescue operation: Search and rescue operations with the assistance of central government's agencies were launched at unprecedented scale, within a couple of days of Kedarnath tragedy. An Emergency Operation Center (EOC) was established by state government. District magistrates were provided with helicopters for effective air dropping of relief materials. A total of 72 relief camps were established to provide immediate shelter to homeless people. State owned guest houses were provided free of cost to stranded tourists. A total of 105,606 people were rescued and evacuated till 30th June. Around five thousand vehicle and 25 helicopters were deployed in rescue operations. Each rescued person was immediately provided a financial support of Rs. 2000, sufficient enough to reach their homes. Free trains and bus tickets were provided to them. A call center was established in Deharudun for providing information regarding missing person. Announcements were made to provide compensations in various categories, e.g., dead, injured, damaged home, etc., and for those whose houses were damaged. A total of 313 doctors and 4977 paramedics were immediately deployed for providing emergency treatment to affected population. Medical camps were organized near affected areas and

some camps, as mentioned in previous chapters, continued for six months and more.

Recovery and restoration: Next task was to ensure the restoration of essential services. Road connectivity, water supply, power and mobile network were most urgent areas required restoration to mitigate the immediate impact of disaster and emergency situation. Around 2,300 personnel were deployed to restore 1,362 damaged water supply systems across the state. Around 816 systems were reportedly restored till 30th June 2013. Similarly, 5, 775 personnel and 364 JCB machines were deployed to restore road transportation. Fifty percent damaged roads were restored till 1st July 2013, which included highways to Joshimath, Uttarkashi, Yamunotri and Guptkashi. Electricity supply was restored in 3215 out of 3757 affected habitations. Within a few months of disaster, recovery projects were planned, sanctioned and started implementation by various line departments to restore the life back to normal. Important recovery projects were initiated by key departments such as agriculture, animal husbandry, irrigation, forest, Jal Nigam, and public work department and electricity department.

B. Gaps

Although, concerned agencies performed extraordinarily to reduce the impact of

catastrophic events, however, evidences suggest towards some gaps in systemic approach for hazard mitigations, preparedness and post impact emergency responses.

- **Lack of decentralized approach:**

Community members, PRIs, local and state level official were interviewed during the research process. It was found that village wise risk assessments, preparedness and decentralized actionable plans to respond to disaster events was not in place. No village level plans were available during field visits. No local level networks were formed till date, even in the areas where disastrous events are occurring each year.

- **Limited involvement of stakeholders:**

Systemic approach towards preparedness, emergency response, mitigation and recovery lack appropriate participation of stakeholders, e.g., community, PRIs, professional agencies, voluntary organizations, and experts, especially at local levels. It was found that networks to respond during emergency situation, was not formed at local levels. Even no efforts were made to form such local networks till the end of year 2014. It was found after discussion with various block, districts and state level key informants that officials involved in administration and routine government activities did not have appropriate time to give attentions towards, preparedness and pre event mitigation. However, systemic approach to preparedness and response rely much on overwhelmed routine government officials.

- **High political interference in mitigation and recovery:**

Many villages, e.g., Pillang, Jaurav, Jimia, Quiri, etc., remain cut off from cities, or situated in very remote areas. They face emergency situation throughout the year. They are more vulnerable to hazards and disasters. However, such communities were not given priorities in mitigation and risk reduction. However, there were evidences that many less vulnerable villages received high level of attention and resources from agencies due to political interference.

- **Poor disaster related advocacy at policy level:**

It was found that poor advocacy, especially at local levels have sidelined the issues related to hazards, risks, vulnerabilities and sustainable development. This is a crucial gap in approach to hazard mitigation, especially in a state which is highly vulnerable to disasters. Current development model of the state is not based on above mention concerns.

- **Lack of effective communication at various levels:**

No evidence of effective communication campaigns was witnessed at any level to aware local population, and stakeholders on a range of issues related to disaster and environment. This gap reduces the involvement and participation of people at large in disaster related preparedness and plans.

- **Inappropriate use of technologies:**

Technology has transformed our lives in many ways, especially mobile and

internet. However, effective use of mobile technology is missing in the systemic approach of preparedness, emergency response and mitigation.

- **Inappropriate integration of traditional knowledge in disaster management:** It was found that age old traditional practices and knowledge of local communities were not effectively integrated in systemic approach to hazard mitigation.

C. Recommendations:

1- **Decentralization of systemic approach to hazard, risk, preparedness and emergency response:** following steps should be followed for effective decentralization of systemic approach.

- Conducting village level hazard and risk assessment with support of professionals and involvement of local communities.
- Development of village level participatory disaster plan development.
- Ensuring effective involvement of local communities in assessment and planning.
- Development of local networks of institutions, agencies, experts, professionals and community members for emergency response to disasters.

1- **Effective integration of traditional knowledge and local technologies:** Appropriate research and documentation of traditional knowledge regarding different aspects must be carried out to enrich the mitigation strategies and evidence

based decision making. Local resource based traditional knowledge & technologies should be promoted by government agencies. Following suggestions can be followed;

- Local geographical, historical and architectural knowledge and coping mechanism interwoven in local culture must be recorded and integrated in systemic approach of emergency response. Similarly local communities contain enormous knowledge regarding seasonality and signs related to hazards and risks. Such knowledge should be captured by effective research projects and to be integrated into hazard mitigation strategies.
- Tourism, PWD and forest departments should build their guest houses on the basis of local traditions, e.g., Kothi Banal, etc. Other Public buildings such as Panchayat buildings, schools, AWs centers should be built on traditional low cost and shock resistant techniques.
- Restore old age high altitude short cuts, passages and passes by using local materials and technologies. These passages were examples of extensive geographical knowledge of local people. However, increased dependency on motor transportations has led these passages disappeared at many places. However, forest department is using and maintaining many such passages. It was found that such passages were used by local communities in Uttarkashi, Bageshwar, and Pithoragarh for reaching nearest cities for emergency needs during extensive roadblocks in 2013.
- Promote village level PRIs to use local technologies in building wooden

bridges on springs and streams and other similar structures to reduce the impact of emergency situation. Such structures can be integrated with employment schemes such as MNREGA. It would reduce the cost as these structures are generally built by locally available materials and skill base.

2- Effective use mobile based technologies and community radio:

- Mobile applications should be used for emergency reporting, monitoring and surveillance of local hazards. Specific mobile applications must be developed with the support of state government. Effective application of such technologies could integrate responses of various agencies lined up at different levels in systemic response and mitigation.
- Mobile application can also play important roles in communication and awareness generation on disaster, climate change and related issues, among people across the state.
- WLL based phone networks with internet must be ensured at the places identified as network dark areas.
- Effective and extensive use of community radio in planning, mitigation and early warning should be explored to reduce the risks and vulnerability.

3- Effective involvement of various stakeholders at state, district and block level: expert agencies, professionals, civil society organizations. Important institutions must be integrated in systemic approach to disaster mitigation and management at important levels. Responsibilities of each stakeholder should be identified during emergency response and in

mitigation. This would automatically bring transparency and reduce extensive political influence.

4- Strengthening of legal framework of hazard mitigation: although government has taken important steps after 2013 however, such measures must be made effective. Appropriate guidelines regarding construction in hazardous areas are in place; however there is a need to take effective action towards their implementation.

5- Use of sustainable technologies: sustainable technologies must be used, especially in development activities, e.g., construction of tunnels, roads, dams, etc.

6- Effective use of appropriate plants for land stabilities. Research must be conducted to explore the possible use of specific species, (Bamboo, Ringal, etc.) of plants which promote land stabilities. Extensive knowledge of local communities, botanists, forest department officials must be integrated in treatment and rehabilitation of affected areas.

7- Sensitizing PDS system and MGNREGA: PDS system must be made more responsive in context of impact mitigation, especially in context of vulnerable communities. Especial benefits to more vulnerable population, in remotest areas should be provided by PDS system. Needs of a person living in Pillang or Jaurav are much higher than those living in Uttarkashi or even, Bhatwari or Madkot.

Appendix

1. Characterization of events took place during 2013, their nature and impacts

Table 2: Uttarkashi

Valley/river	Villages	Nature of extreme events	Main problem	Immediate impact
Upper Bhagirathi Valley	<ul style="list-style-type: none"> • Morkonda • Mukhwa • Harsh • Bagori • Jhala 	<ul style="list-style-type: none"> • Excessive rain, • Slide (in Bagori) 	<ul style="list-style-type: none"> • NH 58 damaged closed for 40 days, • Around 10000 Tourists stranded • Supplies of essential commodities suffered 	<ul style="list-style-type: none"> • Information and communication system • Gangotri based livelihood suffered • Marketing of apple suffered • Communication family members living in Uttarkashi • Shortage of essential commodities and high prices
Middle Bhagirathi Valley	<ul style="list-style-type: none"> • Bhatwari • Barsu • Kujjan • Mulla • Bhelatipri 	<ul style="list-style-type: none"> • Excessive rain, • Flood (Bhelatipri) • land sinking • Rock fall (Bhelatipri) 	<ul style="list-style-type: none"> • Impact of 2012 disaster intensified • Road blocks and obstructions supplies • Sinking (Barsu, Kujjan, Bhatwari) 	<ul style="list-style-type: none"> • Shortage of essential commodities and high prices • Fear due to sinking of land (Barsu, Kujjan, and Bhatwari.) • Adventure tourism based livelihood heavily suffered • Impact of 2012 disaster intensified: Cracks widened in houses and public building in Barsu, Kujjan, and Bhatwari • Marketing of Potato (Kujjan, Barsu, Barsu) • Wash out of agricultural land (Bhelatipri) • Information and communication system
Pillangad Valley	<ul style="list-style-type: none"> • Silla • Jaurav • Pillang 	<ul style="list-style-type: none"> • Excessive rain, • Flood (far below the residential area) • Slides (on seismic rapture caused in 1991 quack) • Rock fall (Jaurav) 	<ul style="list-style-type: none"> • Village connectivity becomes difficult • Huge slide cut of the village Pillang • Sinking (Barsu, Kujjan, Bhatwari) 	<ul style="list-style-type: none"> • Shortage of essential commodities • Fear due to slide and rockfall (Pillagn, Jaurav) • Sense of insecurity due to remoteness of villages • Wash out of agricultural land • Problem in marketing of agricultural produce due to high transportation cost (rent of ponies) • High transportation cost of essential goods (permanent problem) • Sinking of land due to seismic rapture
Asiganga Valley	<ul style="list-style-type: none"> • Agora • Bhankoli • Gajouli 	<ul style="list-style-type: none"> • Excessive rain, • Flood (far below the residential area) • Huge Slides (outside villages) 	<ol style="list-style-type: none"> 1. Road block 2. Village connectivity (Bhankoli, Agora) 3. Heavy slides on the way (Bhankoli, Agora) 	<ul style="list-style-type: none"> • Adventure tourism based livelihood heavily suffered • Shortage of essential commodities • Very poor connectivity due to huge slides (Bhankoli, Agora) • Wash out of agricultural land due to food and slides (Bhankoli, Agora) • Production of potato, Rajma (Red Kidney Bean), Cholai (Amaranth) • Seepage of underground water inside houses (Agora)

Table 3: Pithoragarh

Valley/river	Villages	Nature of extreme events	Main problem	Immediate impact
Upper Goriganga (Munisiari)	<ul style="list-style-type: none"> • Jimiya • Quiri • Senar • Pyankti • Papri • Dhapa 	<ul style="list-style-type: none"> • Excessive rain, • Slide • Rockfall • 	<ul style="list-style-type: none"> • Past slides intensified. (Jimiya, Quiri) • Connectivity • Washing out of agricultural land 	<ul style="list-style-type: none"> • Fear and emergency conditions • Agriculture and animal suffered • Damages to buildings and infrastructure • Shortage of essential commodities and high prices • Information and communication system • Education
Middle Goriganga	<ul style="list-style-type: none"> • Madkot (Munisiari) • Ghattabagar (Dharchula) 	<ul style="list-style-type: none"> • Excessive rain, • Flood 	<ul style="list-style-type: none"> • Washout of village (Ghattabagar) • Washout of roadside buildings (Madkot) • Road blocks 	<ul style="list-style-type: none"> • Shortage of essential commodities and high prices • Fear due to sinking of land (Barsu, Kujjan, and Bhatwari.) • Adventure tourism based livelihood heavily suffered • Impact of 2012 disaster intensified: Cracks widened in houses and public building in Barsu, Kujjan, and Bhatwari • Marketing of Potato (Kujjan, Barsu, Barsu) • Wash out of agricultural land (Bhelatipri) • Information and communication system
Dhauliganga. (Darma Valley, Dharchula)	<ul style="list-style-type: none"> • Neeu • Sobla • Khet • Tejam 	<ul style="list-style-type: none"> • Excessive rain, • Flood • Slide (Tejam) 	<ul style="list-style-type: none"> • Washout of village (Sobla, Neeu) • Damages to buildings • Road damage and blockage • Huge slide • Sinking (Khet) 	<ul style="list-style-type: none"> • Shortage of essential commodities • Fear due to slide and rockfall (Pillagn, Jaurav) • Sense of insecurity due to remoteness of villages • Wash out of agricultural land • Problem in marketing of agricultural produce due to high transportation cost (rent of ponies) • High transportation cost of essential goods (permanent problem) • Sinking of land due to seismic rapture
Kali (Dharchula)	<ul style="list-style-type: none"> • Kutti • Buddhi • Napaltue 	<ul style="list-style-type: none"> • Excessive rain, • Slides 	4. Road block	<ul style="list-style-type: none"> • Adventure tourism based livelihood heavily suffered • Shortage of essential commodities • Very poor connectivity due to huge slides • Production of potato, Rajma (Red Kidney Bean).

Table 4: Bageshwar

Valley/river	Villages	Nature of extreme events	Main problem	Immediate impact
Upper Pinder Valley	<ul style="list-style-type: none"> • Kharakiya • Khati • Wchham 	<ul style="list-style-type: none"> • Excessive rain. • Slide • Rockfall 	<ul style="list-style-type: none"> • Road blocks (chronic: ever happening) • Connectivity • Washing out of agricultural land 	<ul style="list-style-type: none"> • Fear and emergency conditions • Tourism based livelihood suffered • Shortage of essential commodities and high prices (Persistent problem) • Information and communication system (Persistent problem) • Poor state of health services (Persistent)
Suryu Valley	<ul style="list-style-type: none"> • Khaibagar • Cheerabagar • Reethabagar • Pothing • Kermi • Gasi • Gasi • Munar 	<ul style="list-style-type: none"> • Excessive rain. • Flood • Cloud burst (Khaibagar 2013, Pothing 2012) 	<ul style="list-style-type: none"> • Cloud burst in Khaibagar • Washout of agricultural land • Road blocks 	<ul style="list-style-type: none"> • Shortage of essential commodities and high prices • Impact of 2012 disaster intensified: Pothing • Marketing of Potato (villages in Pinder valley) • Wash out of agricultural land (village on survey river) • Breakdown of Information and communication system
Revati Valley	<ul style="list-style-type: none"> • Sama 	<ul style="list-style-type: none"> • Excessive rain. • Slide 	<ul style="list-style-type: none"> • Land slides 	<ul style="list-style-type: none"> • Wash out of agricultural land

Appendix

2. Tool

निर्देशिका

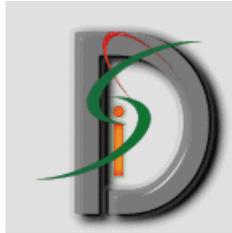
शोध का शीर्षक:

“उत्तराखण्ड के तीन प्रभावित जिलों में स्थानीय समुदाय एवं उसके सदस्यों पर आपदा के प्रभाव का आकलन”

आपदा न्यूनीकरण एवं प्रबन्धन केन्द्र,

उत्तराखण्ड शासन,

देहरादून



डेवलपमेन्ट इनसाइट्स फॉर सस्टेनेबल एक्शन (DISA),

शोध में भागीदारी के लिये मौखिक सहमति
(सहमति लेने से पूर्व शोधकर्ता निम्न को पढ़ के सहमतिदाता को सुनाए)

शोध का शीर्षक: "उत्तराखण्ड के तीन प्रभावित जिलों में स्थानीय समुदाय एवं उसके सदस्यों पर आपदा के प्रभाव का आकलन"

अध्ययन का उद्देश्य

- हम आपसे डी. एम. एम. सी., उत्तराखण्ड शासन, देहरादून के सहयोग से डेवलपमेन्ट इनसाइट्स सर्स्टेनेबल एक्शन द्वारा स्थानीय समुदाय एवं उसके सदस्यों पर आपदा के प्रभाव का आकलन से सम्बन्धित शोध में सहयोग एवं भागीदारी का आग्रह करते हैं।
- इस भागीदारी के अर्न्तगत एक प्रशिक्षित शोधकर्ता द्वारा स्थानीय समुदाय के सदस्यों के साथ साक्षात्कार का आयोजन किया जायेगा जिसमें स्थानीय समुदाय एवं उसके सदस्यों पर आपदा के प्रभाव से सम्बन्धित चर्चा करके जानकारी प्राप्त की जायेगी।

अध्ययन में आपकी भूमिका

- उक्त अध्ययन के सन्दर्भ में हमारे सहयोगी शोधकर्ता अलग-अलग उम्र, लिंग एवं सामाजिक-अर्थिक समूहों के सदस्यों से शोध में भाग लेने का आग्रह करेंगे। यदि आप इस शोध में अपनी महत्वपूर्ण भागीदारी के लिये सहमत होते हैं तो आपसे निवेदन है कि अपना 30 से 40 मिनट का समय साक्षात्कार के लिये देने की कृपा कीजिए।
- आपके साथ साक्षात्कार की तिथि एवं समय की सूचना आपको पहले दे दी जायेगी। इस साक्षात्कार में आपकी भागीदारी स्वैक्षिक है अतः किसी प्रश्न का जवाब देना या ना देना पूर्णतः आपकी इच्छा पर निर्भर करेगा। इसके अलावा अगर आप चाहे तो साक्षात्कार किसी भी वक्त समाप्त करने का आग्रह कर सकते हैं।

गोपनीयता

- शोध की आवश्यकताओं एवं विश्लेषण के लिये उक्त साक्षात्कार की ऑडियो रिकार्डिंग की जायेगी। शोध के उपरान्त ऑडियो फाइल नष्ट कर दिया जायेगा एवं आपका नाम या आपसे सम्बन्धित और कोई जानकारी बिना आपकी सहमति से कहीं भी प्रकाशित नहीं की जायेगी।

शोध में आपकी भागीदारी से सम्बन्धित सम्भावित अन्य बातें

- यह सम्भव है कि चर्चा के दौरान शोधकर्ता आपसे कुछ ऐसे प्रश्न पूछे जिससे पिछली घटनाओं एवं आपकी भावनाओं का सम्बन्ध हो अतः हमें उम्मीद है कि आप मानसिक रूप से साक्षात्कार के लिये तैयार होंगे।

यह प्रमाणित किया जाता है कि सहमति प्रदान करने वाले भागीदारों को शोध की प्रकृति, उद्देश्य एवं इसमें उनकी भागीदारी से सम्बन्धित अन्य आवश्यक बातें पढ़ के सुनाई गई हैं एवं समझाया गया है।

सहमति प्राप्त करने वाले शोधकर्ता के हस्ताक्षर

स्थान

दिनांक

शोध का शीर्षक: "उत्तराखण्ड के तीन प्रभावित जिलों में स्थानीय समुदाय एवं उसके सदस्यों पर आपदा के प्रभाव का आकलन"

केन्द्रित समूह चर्चा (FGD) निर्देशिका

शोधकर्ता का नाम: _____

साक्षात्कार/चर्चा की तिथि: _____

साक्षात्कार/चर्चा का स्थान: _____

साक्षात्कार/चर्चा का समय _____

शोधकर्ता के विवरण एवं विचार (गांव, समुदाय एवं भागीदार से सम्बन्धित कोई आवश्यक जानकारी)

समूह का विशिष्ट संकेत (कोड)

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गांव का नाम:	ब्लॉक एवं जिला:
सामाजिक समूह:	लिंग समूह:

आयु समूह:	भागीदारों की संख्या:
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a. आपदा का स्वरूप

- **Main question:** आपदा गांव में किस रूप में आई? (leads: excessive rain, flash flood, cloud burst, landslide, other)
- **Follow up with timeline:** क्या इस गांव में इस तरह की आपदा पहले भी आती रही है? (**use time line chart-1**)
- **Follow up with seasonality map:** अधिकांश: साल के किन महीनों में इस तरह की घटनाएं ज्यादा घटती हैं? (**use seasonality chart-1**)
- **Follow up question:** आपदा अचानक ही आई या कोई पूर्वअनुमान आप लोगों को हो गया था? (Probe : अगर पूर्वअनुमान हुआ था तो किस आधार पर— कोई सूचना, कोई लक्षण, कोई पुरानी घटना की याद)

b. आपदा के प्रभाव का स्वरूप

- **Main question:** गांव पर, गांव के जीवन में और गांव के लोगों पर इस आपदा ने किस रूप में प्रभाव डाला? (Leads : जान माल की क्षति, भय, विषय, और अनिश्चितता का माहौल, आधारभूत संरचना **infrastructure** को भारी नुकसान, यातायात एवं संचार के साधनों का ध्वस्त होना, सूचना तंत्र टूट जाना, गांव के खाद्य सामग्री एवं जलावन का खत्म होना, जनजीवन ठप हो जाना)
- **Main question:** आपदा के दौरान एवं उसके तुरन्त बाद (24 घंटों में) आपके सामने क्या परेशानियाँ आईं एवं आपने कैसे उनसे अपना बचाव किया?
- **Follow up question:** (**use problem ranking template**): आपदा के द्वारा गांव के जीवन में जो परेशानियाँ आई हैं या उस समय आई थी उसमें गम्भीरता या विकरालता के आधार पर एक क्रम बनाएं:

1. सबसे बड़ी परेशानी: क्यों?
2. दूसरे नम्बर की सबसे बड़ी परेशानी: क्यों?
3. तीसरी सबसे बड़ी परेशानी: क्यों?
4. चौथी परेशानी: क्या?
5. पाचवी परेशानी: क्या?

c. आपदा के कारण मृत्यु एवं शारीरिक नुकसान

Main question: क्या आपदा में गांव के कुछ लोगों की मृत्यु हुई? (Follow up 1 : यदि हाँ तो कितनों की आपदा के 3 से 4 दिनों के दौरान और कितनों की उसके बाद? Follow up 2 : इसमें कितने बच्चों, कितनी महिलाएं, एवं कितने वृद्ध थे?)

d. गांव के आधारभूत संरचना **infrastructure** एवं आवागमन के साधनों पर प्रभाव और इससे स्थानीय लोगों के जनजीवन पर प्रभाव

- **Main question:** एक एक करके बताएं कि आपदा का गांव के निम्न आधारभूत संरचना **infrastructure** और संचार के साधनों पर क्या प्रभाव पड़ा?
1. शहर की तरफ जाने वाला मुख्य मार्ग ? (Probe : नुकसान की प्रकृति- पूर्ण या आंशिक)
 2. गांव के अन्दर की सड़क एवं पंगडन्डियां? (Probe : नुकसान की प्रकृति- पूर्ण या आंशिक)
 3. आवासियां क्षेत्र एवं आवास? (Probe : क्या पूरा आवासियां क्षेत्र प्रभावित हुआ या कुछ भवन ही? कितने भवनों को नुकसान हुआ?)
 4. पंचायत की एवं अन्य सार्वजनिक भवन-स्कूल, स्वास्थ्य केन्द्र, मन्दिर इत्यादि? और इससे स्थानीय लोगों के जनजीवन पर क्या प्रभाव पड़ा
 5. (Probe : अगर नुकसान हुआ हुआ तो कैसा- पूरी तरह से, क्षतिग्रस्त या आंशिक रूप से)
 6. जल के स्रोत ? (Probe : कितने जल के स्रोत प्रभावित हुये? किस तरह के जल स्रोत? कितने समय तक?)
 7. नाली एवं नलों पर
 8. साफ सफाई पर

e. गांव के सूचना एवं संचार तंत्र पर प्रभाव

- Communication ecology mapping: (use communication ecology map format)
- कौन-कौन से कम्युनिकेशन एवं संचार के माध्यम आपदा के समय फेल हो गये (probe: electronic-TV-Radio, mobile, print, interpersonal, etc)
- गम्भीर समय पर सूचनाएं किन स्तरों से प्राप्त हुईं?
- राहत कार्य के समय सूचना के किन माध्यमों का इस्तेमाल हुआ?

f. गांव के प्राकृतिक संसाधनों पर प्रभाव (note: ask question with **resource mapping**: supported by photo documentation)

- गांव के जंगल एवं पहाड़ पर कोई प्रभाव? (Follow up : प्रभाव की प्रकृति: स्थायी, गम्भीर, एवं आंशिक)
- गांव की जमीन पर कोई प्रभाव? (Follow up : प्रभाव की प्रकृति: स्थायी, गम्भीर, एवं आंशिक)
- जल के स्रोतों पर प्रभाव? (Follow up : प्रभाव की प्रकृति: स्थायी, गम्भीर, एवं आंशिक)
- अन्य प्राकृतिक संसाधनों पर प्रभाव?

g. गांव के आर्थिक जीवन पर प्रभाव

- कृषि पर तात्कालिक प्रभाव?

- कृषि पर दूरगामी प्रभाव? (Leads : खेत-मिट्टी का बह जाना, इत्यादि Probes : अगर हॉ तो लोगों के अर्थिक जीवन पर क्या प्रभाव पड़ा?)
- किसी तरह का प्रभाव लोगों के रोजगार या आजीविका के साधनों पर? (Follow up : क्या? प्रभाव की प्रकृति: स्थायी, गम्भीर, एवं आंशिक)
- क्या स्थानीय रोजगार के अवसर घटे हैं? (Follow up : यदि हॉ तो अनुमान लगा कर बताएं पहले से कितना ज्यादा? (use Anna Scale : चार आना, आठ आना, बारह आना, एवं रूपया, इत्यादि?)

h. आवश्यक स्तरों पर असर

Main question: क्या गांव में आवश्यक सेवाओं जैसे, स्वास्थ्य, शिक्षा, पी डी एस, पर असर पड़ा है? (Follow up : यदि हॉ? तो क्या-क्या असर पड़ा विस्तार से बताएं? क्या उसमें सुधार हुआ या अभी स्थितियां पहले जैसी हैं?)

- स्वास्थ्य सेवाएं
- शिक्षा एवं स्कूल
- बिजली
- सड़क
- पी डी एस व्यवस्था
- पेयजल व्यवस्था
- अन्य

Main question: क्या आपदा के आने से गांव के सामाजिक आयोजनों जैसे शादी, सांस्कृतिक एवं परम्परागत त्यौहारों पर भी असर पड़ा ?

i. गांव में आवश्यक वस्तुओं की सप्लाई एवं बाजार पर प्रभाव

- **Main question:** क्या आपके इस आपदा का बाजार, भाव एवं आवश्यक वस्तुओं की सप्लाई पर भी असर महसूस हुआ? (Follow up 1: यदि हॉ तो तात्कालिक रूप से किन वस्तुओं की सप्लाई बन्द हुई, एवं किन के भाव आसमान पर चढ़ गये? Follow up 2: स्थितियां सामान्य होने में कितना वक्त लगा? Follow up 3: क्या बाजार पर इस आपदा का कुछ असर अभी भी है? क्या?)

j. महिलाओं, बच्चों एवं बुजुर्गों पर प्रभाव

- **Main question:** क्या महिलाओ को कुछ विशेष परेशानियों का सामना करना पड़ा? (Follow up : यदि हॉ? तो क्या ?)
- **Main question:** क्या बच्चों एवं बुजुर्गों को भी कुछ विशेष परेशानियों का सामना करना पड़ा? (Follow up : यदि हॉ? तो क्या ?)

k. आपदा के प्रभाव की प्रकृति

- **Main question:** इस आपदा का कुल मिलाकर जो प्रभाव पड़ा है आपके और आपके परिवार के उपर, आपको क्या लगता है कि क्या उसकी भरपाई हो पायेगी?
- **Follow up 1a:** अगर नहीं तो क्यों?
- **Follow up 1b:** अगर हाँ तो कितना टाइम लग जायेगा?
- **Follow up 2:** इसके लिये आपको और आपके परिवार को क्या प्रयास करना पड़ेगा?

समाप्ति

हमारी तरफ से ये साक्षात्कार समाप्त होता है अगर आप इसमें कुछ जोड़ना चाहते है तो अपनी बात जरूर रखें।

आपने अपना इतना कीमती समय निकाला और अपने अनुभवों को हमारे साथ साझा किया। इसके लिये हम आपका तह दिल से शुक्रिया अदा करते है

आपका बहुत बहुत धन्यवाद,

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