

A  
Research Report  
On  
**“Humanitarian Logistics in Uttarakhand at  
the Time of Natural Disaster 2013”**  
Demystifying Kedarnath 2013



**Under the Supervision of:**

**COMES**

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## **REPORT CERTIFICATE**

We hereby certify that the work which is being presented in the project report entitled “**Humanitarian Logistics in Uttarakhand at the Time of Natural Disaster 2013**” in partial fulfilment of the requirements for the satisfactory performance for MBA Logistics and Supply chain, Report submitted in the Department of Management studies, University of Petroleum and Energy Studies, Dehradun is an authentic record of my own work carried out during a given period as allotted by mentor.

### **SUBMITTED BY:**

Zain Husain

This is to certify that the above statement made by the candidate is correct to the best of our knowledge.

Guide: **Dr. Neeraj Anand** and **P.C Bhahuguna**

Date: April 9, 2015

## ACKNOWLEDGEMENTS

It is with a sense of great satisfaction and pride that we are sitting down to pen out our report. First and foremost we sincerely salute our esteemed Institution **University of Petroleum & Energy Studies, Dehradun** for giving this golden opportunity to study and understand the “Humanitarian Logistics in Uttarakhand at the Time of Natural Disaster 2013”.

We would like to thank **Dr. Neeraj Anand**, for his help & encouragement during the work. We also thank all faculty, staff, and students of Department of Management studies for rendering help during various stages of the project work.

We are Heartily Thankful to: For providing the valuable information best of their knowledge.

**Mrs. Rakhi Rawat**

Designation: Sub Inspector of Police at Ram Jhula Rishikesh

**Mr. Santosh Kumar**

**Designation:** Chief Incharge of Photography in Forensic Scientific Lab of Uttarakhand (Governed Under Police Department).

**Mr. Vikas Seni and Mr. Vinod Shah**

**Designation:** Head Munshi & Constable at Laxman Jhula Rishikesh

**Mr. Rinku Thapa**

**Designation:** Deputy Commandant ITBP (Indo-Tibetan Border Police).

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## INTRODUCTION

### Humanitarian Logistics

Humanitarian logistics is a branch of logistics which specialize in organizing the delivery and warehousing of supply during natural disaster of emergencies to the affected area and people.



In June 2013, a multi-day cloudburst centered on the North Indian state of Uttarakhand caused devastating floods and landslides in the country's worst natural disaster since the 2004 tsunami. As of 16th July 2013, according to figures provided by the Uttarakhand government, more than 5,700 people were "presumed dead." This total included 934 local residents. Landslides, due to the floods, damaged several houses and structures, killing those who were trapped. The heavy rains resulted in large flashfloods and massive landslides.

Parts of villages and settlements such as Jaltalla, Jalmalla, Chillaund, Chaumasi, Kotma of Kalimarh and Pathalida, Dungarsanmela, Pali, Dangwadi, Tilwada in Ukhimath in Rudraparayag district have been obliterated. The river Mandakini has wreaked havoc on these villages killing almost 139 people in the above stated villages.

- As the rains and cloudburst ravaged Utrakhand on 15<sup>th</sup> June 2013
- Thousands of pilgrims who has embarked their journey to the holy places of Kedarnath and Badrinath.
- They were left shell shocked by the pernicious circumstances that they ended up facing.
- Utrakhand received 313mm of rainfall from 14<sup>th</sup> June to 17<sup>th</sup> June
- This rainfall was 375% above the normal benchmark of 65.9mm rainfall received every year.
- More than 150 bridges and 1300 roads connecting parts of Utrakhand were damaged.
- Some of the roads were beyond the point of repair.



### **Natural Reasons**

- From 14 to 17 June 2013, Indian state of Uttarakhand and near by received heavy rainfall which was about 37.5 percent more than the benchmark rainfall during a normal monsoon.
- Due to this Continuous Raining the Chorabari Glacier melted and this triggered the flooding of the Mandakini river.
- A multi-day cloudburst ,centered on the Uttarakhand caused devastating floods and landslides.
- Which also led to heavy floods near Gobindghat, Kedar Dome, Rudraprayag district, Uttarakhand.

### **Man Made Reasons**

- Increasing human activities such as hydro-power projects, roads, hotels and dharmshalas in the name of development has disturbed fragile ecosystem and has snapped the spirit of life in the Himalayan region causing calamities.
- The entire Himalayan watershed is an eco-sensitive zone, and deforestation in this zone has led to landslides and floods.

## Death and Damages

- 822 Deaths occurred in flood (official estimates).
- 1,800 were Missing persons.
- 2,232 houses were fully damaged.
- 4,200 villages were affected.
- 1,520 roads got Damage.
- Over 70,000 people were stuck in various regions because of damaged or blocked roads.
- National Highway 58, An important artery near region Jyotirmath was also washed away .

## RESCUE OPERATION



- By 21 June 2013, the Army had deployed 10,000 soldiers and 11 helicopters.
- The Navy had sent 45 naval divers, and the Air force had deployed 43 aircraft including 36 helicopters.



- The Army, Air Force, Navy, Indo-Tibetan Border Police (ITBP), Border Security Force, National Disaster Response Force (NDRF), Public Works Department and local administrations worked together for quick rescue operations.
- Prime Minister of India undertook an aerial survey of the affected areas and announced 1000 crore (US\$150 million) aid package for disaster relief efforts in the state.
- Several state governments announced financial assistance, with Uttar Pradesh Govt pledging 25 crore(US\$3.8 million).
- The governments of Haryana and Delhi gave 10 crore (US\$1.5 million).
- The US Ambassador also extended a financial help of USD \$150,000 through the United States Agency.

## **Introduction to the Research**

This Research Project is about the alternatives routes in the rural areas of Uttarakhand at the time of natural disaster. Uttarakhand is prone to natural disasters which happens quite frequently such as flood and landslides. Therefore there is a need for improvement in the infrastructure such as roads(rural and urban).Since there are many tourist and religious places, especially in char dham, i.e Haridwar, Rishikesh, Kedarnath and Badrinath. There is a huge amount of pilgrims at these places, therefore there is a need for improvement in evacuation routes especially in rural areas also at the time of a disaster.

In Delhi, officials dealing with post-disaster management scenario said the biggest challenge now is to reach out to remote areas where pilgrims and locals are still stranded and give them essentials like chlorine tablets, medicine, ration, fuel and clothes.

“The challenge is how to take essentials to the locals. For this we need alternative routes as the existing roads have been washed away. We will have to take the help of mules and coolies on a gigantic scale to do all this,” said the official. But what is the government doing? Are they actually finding the alternative routes or busy settling their inter government issues and avoiding this calamity and its seriousness?

## **ROLE OF GOVERNMENT**

A report commissioned by the Union Environment and Forests Ministry in 2012, warned the Centre against going ahead with 24 hydropower projects planned on the Alaknanda and Bhagirathi river systems in Uttarakhand. The report prepared by the Wildlife Institute of India (WII), Dehradun, cautioned that the projects would destroy 22 per cent of the State's forestland and affect the unique Himalayan ecology along one-third of lengths of the two main tributaries of the Ganga. And yet, Vijay Bahuguna, Former Chief Minister of Uttarakhand, claims that there are only three dams on the Ganga and that the proposal for constructing 70 new hydro power projects was assessed and cleared by scientists and environmentalists.

Dams are neither eco-friendly nor people-friendly. The displacement of whole communities caused by dams and their rehabilitation is the cause of much controversy and unrest in many States in India. But, there are better alternatives to dams.

This clearly shows that government has just tried to escape from all responsibilities and there were always the alternate way for preventing everything but they were not even given a thought.

This is the reason why students like us choose this extremely important and most avoided topic and decided to search for the alternate routes and work for the welfare of the common native people and tourists of Uttarakhand.

## **Background of the Problem**

The background of the problem are the basic symptoms which shows the effect of disaster on the areas of Uttarakhand such are heavy loss of life ,Damage to infrastructure ,

Uttarakhand and Himachal Pradesh, two hill states in the Himalayan range, are so far the worst hit by the extreme rains that struck northern India in the wake of monsoons that set in early this year. Media reports say nearly 60 persons have died in Uttarakhand, and an estimated 60,000 pilgrims are stranded. Heavy rainfall has wreaked havoc on the region because of the fragile nature of the Himalayan range and poor soil stability in its steep slopes. But it is man-made factors that have compounded the scale of the disaster. Unabated expansion of hydro-power projects and construction of roads to accommodate ever-increasing tourism, especially religious tourism, are also major causes for the unprecedented scale of devastation, say experts.

"The valleys of the Yamuna, the Ganga and the Alaknanda witness heavy traffic of tourists. For this, the government has to construct new roads and widen the existing ones," says Maharaj Pandit, professor with the Department of Environmental Sciences in Delhi University. He says that a study should be conducted to assess the carrying capacity of the Himalaya and development should be planned accordingly.

## Literature Review

AUTHOR	PAPER	FINDINGS/IFERENCES
Robert E. Overstreet Dianne Hall Kelly Rainer	Humanitarian Logistics Research	Improving Humanitarian logistics effencies
Priyanka Roi Dr. Pavel Albores Dr Cristifer Brewester	Logistical Framework for last mile relief distribution in Humanitarian supply chain	Last mile relief distribution
C.Diaz-Delgalgado J.Gaytan Iniestra	Flood risk Assesment In Humanitarian logistics process Design	Humanitarian logistics based on forecasted models of floods

### Hazard:

“Hazard” is the probability that in a given period in a given area, an extreme potentially damaging natural phenomenon occurs that induce air, earth movements, which affect a given zone. The magnitude of the phenomenon, the probability of its occurrence and the extent of its impact can vary and, in some cases, be determined (Ologunorisa and Abawua 2005).

**Disaster:** “Disaster” defines as what occurs when the impact of a hazard on a section of society (causing death, injury, loss of property or economic losses) overwhelms that society’s ability to cope (Twigg 2004).

“Disaster” refers to situation when significant number of people had been affected by the hazard, be it to their livelihood, lives and properties, that made them incapable of regaining or coping with losses”(Blaikie.P, Cannon.T et al. 1994).

The cost of disaster can be calculated according to the type of disaster and those involved in it. It can be broadly divided into:

- Cost of interruption and /or Cessation of services
- Damage and destruction of material goods
- Injury and /or fatalities to personnel
- Effects on the natural and social environment

The government and the people had their respective hazard mitigation and response programs at different flood stages—before, during and after flooding. This includes preparedness, response and recovery.

Preparedness involves the inclusion of educating the public and the managers in conceptualizing and providing emergency training courses.

Response consists of the use of human, financial and physical resources, search and rescues, temporary shelters to the affected public and relief food items.

While the recovery involves the repair and reconstruction, rehabilitation planning and implementation of disaster management program.

## **Evacuation types:-**

**Horizontal evacuation:** Moving people to more distant location or higher ground.

Advantages: Almost safe from the disaster, No cost of building flood resistant structures.

Requirement: Good condition roads and bridges and designated route, Building should be located within walking or running distance.

**Vertical Evacuation:** Moving people to higher floors or building.

Advantages: Applicable to places where there is no high ground, Applicable in limitation of time, infrastructure and mode of Transport.

Requirement: Adequate buildings in terms of strength, capacity, utility and accessibility Stair with must accommodate 2 persons, Stair steepness – dimension of horizontal and vertical step/path, railing should meet architectural standard.

### **Evacuation route**

The Evacuation Problem can be structured as a shortest path problem. The objective is to route the traffic from origins to destinations as quickly as possible. An evacuation route depends upon the amount of travel cost information that is: road width, speed limit, road class, delay at traffic lights, delays in taking turns at crossroads, wave height.

### **Conclusion**

This project describes the alternative routes through the rural areas of Uttarakhand at the time of natural disaster like landslides and floods. This research defines hazard, disaster, vulnerability, damage, risk indicators and vulnerability indicators. It explains various methods of evacuation process through the mountains and jungle in the state and also determines the evacuation routes.

## Rangiya, Assam

- Assam's worst flood in Eight Years.
- Assam and parts of North East India were stuck by floods in July.
- Leaving atleast 30 people Dead and over 17.60 lakh were affected.
- Flood accured due to breaches in the upper area of river Bhrama Putra
- that causes Death of 595 wild animals
- Around 512 were hock deer who failed to navigate high speed of water died.





## Super Storm Sandy ,US

- Super storm Sandy hit the US in October 2012.
- New Yorkers Struggles to restore vital services and clear Debris after a wall fo storm driven Seawater Swamped Road and Rail tunnels.
- Over 8 million homes and Businesses from the Carolinas to MAined faces power outages and flood shortages
- These Disasters brig a lot of Unstability and pain and it may take a complete life to recover it.



## **Research Problem:-**

Unavailability of alternative routes in the rural areas of Uttarakhand during a natural calamity.

## **Research Gap:-**

Research gap basically means that what has not been done yet related to the research topic that is the gap which is not yet been filled. There are two gap which we have noticed or found that:-

- There was no study conducted for the proper evacuation routes at the time of the disaster.
- There was no initiative to find out the proper alternative routes in the rural areas of Uttarakhand.

## **Research Questions:-**

- What routes haven been taken before at the time of major natural calamity for evacuation ?
- What kind of alternative routes can be adopted to make the evacuation easier?
- What initiatives are been taken by the government to make the evacuation more easier?
- What can be done to have a better evacuation at the time of natural calamity?
- What are the major things that should be done before, as the preparation for the future natural calamities?

## **Research Objective:-**

- To find out the alternative routes to make the evacuation easier at the time of a natural disaster.
- To find out the possible routes in the rural areas of Uttarakhand.
- To find out the main issues faced during evacuation process at the time of flood 2013 in Uttarakhand.

## **Research Design:-**

According to our topic “Alternative routes in the rural areas of Uttarakhand at the time of natural disaster” Exploratory research design is to be taken place because the research problem has not yet been clearly defined. It is a hidden area which is not been explored(less explored), so to explore the unexplored area the exploratory research design is best to implement.

Exploratory research provides insights into and comprehension of an issue or situation. It draws definitive conclusions only with extreme caution. The research design is flexible, Versatile etc.

Formulation of hypothesis or any theoretical framework is been done at the end.

### **Data Sources:-**

- Members of ITBP and State Transport Ministry.
- Police and Government officials for infrastructure in Uttarakhand.
- Local people of Haridwar, Tehri, Rishikesh region.

### **Techniques or Methods of Exploratory Research design used are:-**

- Expert Opinion.
- Unstructured Depth Interviews.
- Focus group.

## **RESEARCH METHEDODOLOGY**

Research methodology used in this research comprises of both primary and secondary data. The reason why we chose to use both the sources is Primary data is used to collect original data. It can be used in marketing, academic, and competitive intelligence. The information can be gather in multiple or single ways. For example, phone interviews and questionnaires can be used. It is wise to use a primary and secondary research to confirm results. The secondary research is normally done by an outside party. The outside party should have a benefit in the outcome. Once the studies are complete, they should be compared.

## **Research Instruments:-**

We chose to use Unstructured and Structured direct interview, Observation and Expert opinion as these are the methods which are best suitable for the research.

### **Unstructured Direct Interview:-**

An unstructured interview is an interview in which questions are not prearranged, allowing for spontaneity and for questions to develop during the course of the interview. It is a qualitative research method and accordingly prioritises validity and the depth of the interviewees' answers. This we have taken as our research instrument because the respondents have different knowledge about the topic, so a unstructured direct interview is more feasible where the unstructured questions are been asked from the respondent according to the knowledge that he or she carries.

### **Observation:-**

Observation is an activity of a person which senses and assimilates the knowledge of the phenomenon or the recording of data using instrument. This is another and important research instrument which we have applied for data collection. We observed respondent while they were answering to our unstructured questions to see whether they have appropriate and reliable knowledge about the topic or not then according to it we increased the level of questions and collected the data which we thought reliable through our observations.

### **Expert Opinion:-**

Expert opinion can be defined as the statement from a specialist on a specific Subject. It is the most important research instrument which is been used most widely by us in collecting the reliable data because our research topic is not general a deep knowledge about is necessary for the respondent. We have interviewed many experts including police of the area of Rishikesh, Tehri, Hardwar and also interviewed the members of foreign scientific lab & ITBP.

## **SAMPLING**

Sampling is the process of selecting units (e.g., people, organizations) from a population of interest so that by studying the sample we may fairly generalize our results back to the population from which they were chosen. Let's begin by covering some of the key terms in sampling like "population" and "sampling frame." Then, because some types of sampling rely upon quantitative models, we'll talk about some of the statistical terms used in sampling.

### **Sampling Unit:-**

- People residing in Haridwar and Rishikesh.
- Members of ITBP, Police and government officers for infrastructure.
- Members of State Transport Ministry.

### **Sample Size :-**

- Sample Size for people residing – 15.
- Sample Size for members of Central and State Government offices- 15.

**Sample size determination** is the act of choosing the number of observations or replicates to include in a statistical sample. The sample size is an important feature of any empirical study in which the goal is to make inferences about a population from a sample. In practice, the sample size used in a study is determined based on the expense of data collection, and the need to have sufficient statistical power . In complicated studies there may be several different sample sizes involved in the study: for example, in a survey sampling involving stratified sampling there would be different sample sizes for each population. In a census, data are collected on the entire population, hence the sample size is equal to the population size. In experimental design, where a study may be divided into different treatment groups, there may be different sample sizes for each group.



**Sampling method : Judgement Sampling.**

A method of sampling designed to ensure that the sample has certain characteristics, usually that it is representative of the population on key variables. As from all sampling methods, we have chosen judgement sampling as our sampling method because everybody just cannot answer accurately to the questions of our topic. Judgement Sampling is a method of non- probability sampling that is sometimes advocated as the selection of universe items by means of our judgement.

## **Scope of the Research**

### **Purpose**

The main aim of this project is to find the alternative routes for better evacuation process at the time of a hazard or a natural disaster such as flood and landslides in Uttarakhand.

The Geographic area covered in this Research includes:

**Dehradun** (Forensic Scientific Lab, Indo-Tibetan Border Police, Disaster Mitigation and Management Center)

**Rishikesh** (Police Stations at Ram and Laxman Jhula)

**Tehri** (Site visit)

Time span for the project **6 months**.

**Total Cost Incurred- ₹**

## **FINDINGS**

It was a great experience of going on an extensive research with having a very interesting project in hand, We have collected the data from many local respondents and also went majorly for expert opinion because the data provided by the local respondents were not authentic and reliable, it seems as if they only have the basic knowledge about it that does not interests our project, so we stopped to collect the data from the local respondents and just focused on expert opinion which helped us in getting the much needed reliable and authentic information for our projects. We will be showing our findings through the interviews which we have taken of the experts.

### **Interview with Mrs. Rakhi Rawat:-**

**Designation: Sub Inspector of  
Police at Ram Jhula Rishikesh**



Our first Interviewee was Rakhi Rawat who is a sub inspector of Police at Ram Jhula Rishikesh, She provided us a basic framework about our research problem though she was not aware about the alternative routes which can be taken at the time of Kedarnath calamity or in the future but she helped us rendering the valuable link of association involved in the evacuation process at the time of Kedarnath Calamity such as Forensic Scientific Department of Uttrakhand, In that she recommended us to meet Mr Santosh Kumar who is the overall incharge of Photography in Forensic Scientific Lab in Dehradun.

While rendering the basic framework of the Kedarnath tragedy she explained that the lead role was played by the Helicopters for the evacuation process .

## **Interview with Mr.Vikas Seni and Mr.Vinod Shah:-**

**Designation:** Head Munshi & Constable at Laxman Jhula Rishikesh

**Date:-**



Our next interview was with Mr.Vikas Seni and Mr.Vinod Shah,They were the keen respondent which helped us in knowing some valuable information about the real situation at that time of the calamity because they were itself in the police rescue team ,They were one of them who were in the Helicopters saving hundreds of lives.

They provided us the information about the alternatives which were taken during the natural calamity when the roads were destroyed from Sonprayag to Kedarnath, Some of the alternatives are:

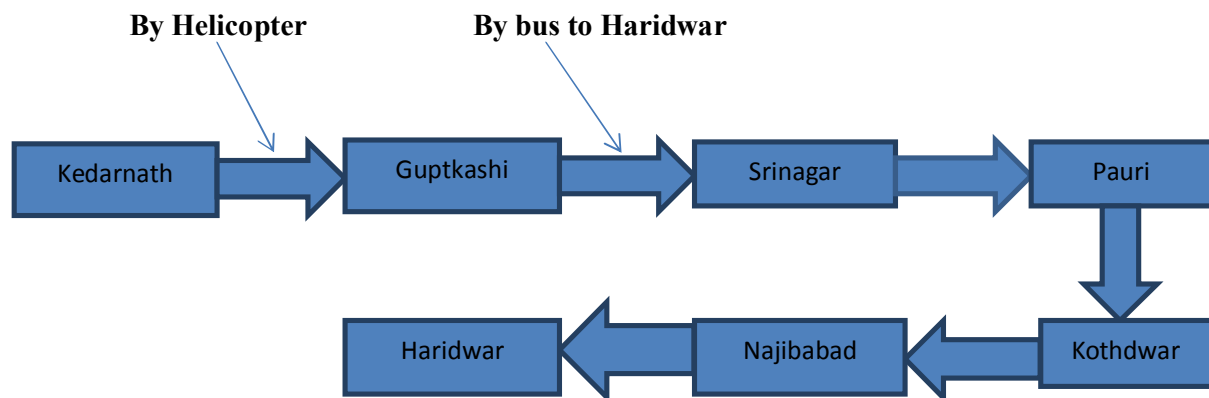
1. Bridges made from the help of woods (Baliyan)
2. Electricity wires were used in developing the new routes(The supply of electricity was shut down from the Oreda Electricity plant)
3. Iron pipes were also been used

So, these were the alternatives which were used according to Mr.Vikas Seni and Mr.Vinod Shah, They also provided some stats about 250 shops/restaurant/homes were destroyed at Rambada, The place between Sonprayag and Kedarnath where the major impact was found.

## **Interview with Mr. A.C. Bhandari:-**

### **Designation: Police officer**

In our third interview, We interviewed Mr A.C Bhandari a police official who provided us with the route which has been taken at the time of natural calamity from kedarnath to haridwar for the Evacuation process. The route was:-



We tried to Find out some alternative routes for evacuation process, but Mr Bhandari was not sure about the alternative routes but he suggested Helicopters, Bridges and Ropes are the best alternatives which can be taken in future from his point of View , if any of this type of natural calamity takes place. Due to the busy schedule of Mr Bhandari , we were not able to ask him more questions about the alternatives routes and preparations for the future natural calamity.

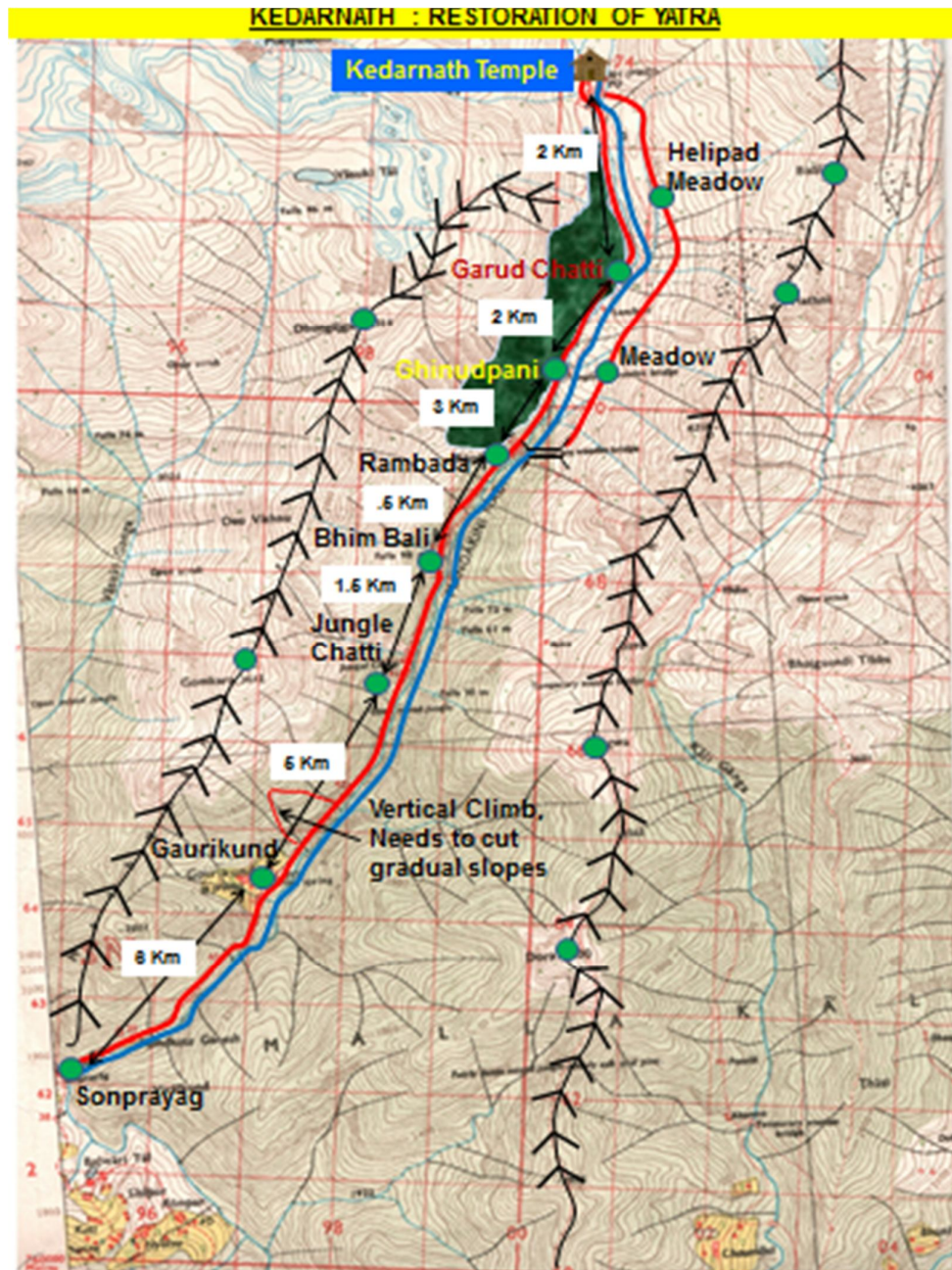
## **Interview with Mr Santosh Kumar:-**

**Designation: Chief Incharge of Photography in Forensic Scientific Lab of Utrakhand (Governed Under Police Department).**

**Date:-15/04/2014**

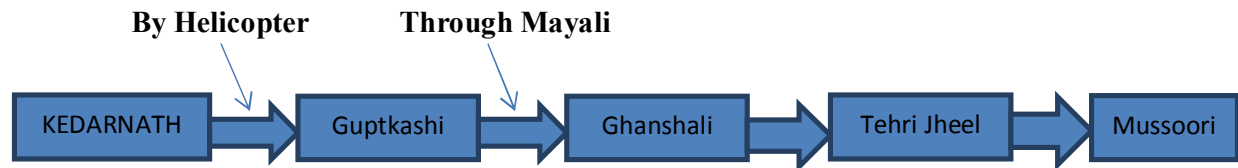


This was the Fourth Interview which provided us with the most valuable information about the alternative routes at the time of natural calamity in kedarnath. Mr. Santosh kumar explained the whole scenario with the alternative routes which can be easily used for the evacuation process.

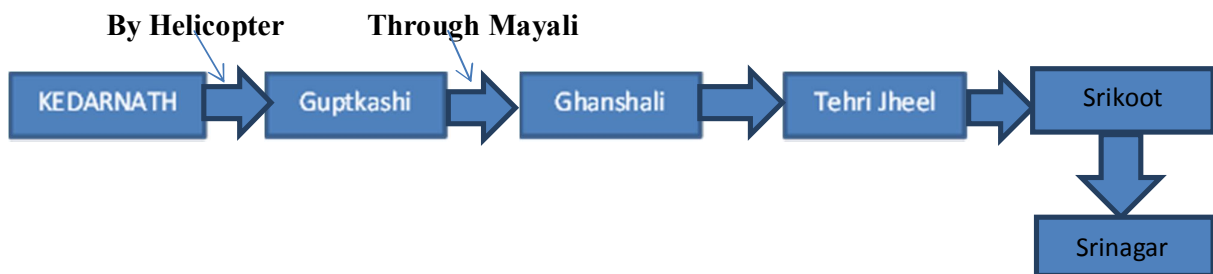


He provided us with certain alternative routes such as:-

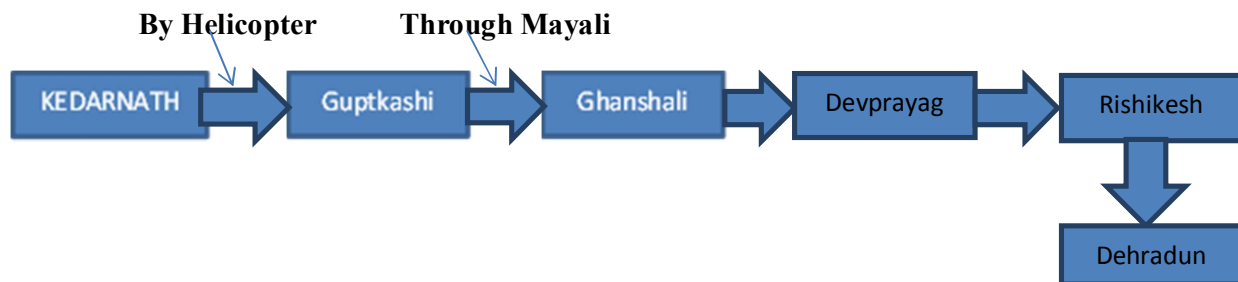
**Route:-1**



**Route:-2**

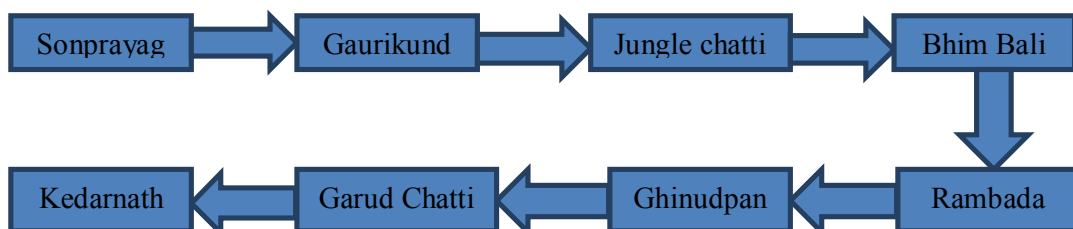


**Route:-3**



He also provided us with the routes which are proposed by the government from **Sonprayag to Kedarnath Temple**.

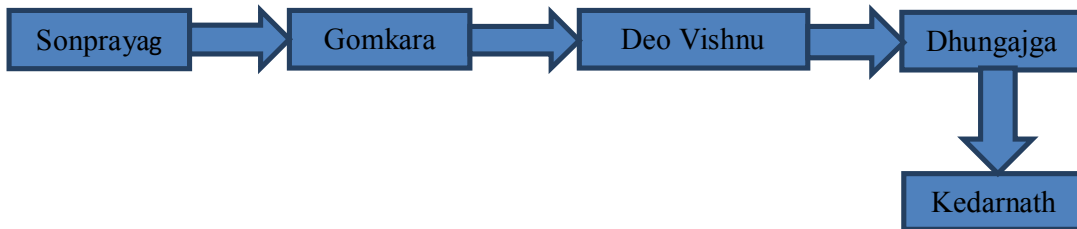
**Older route which is been normally used earlier but now destroyed:**



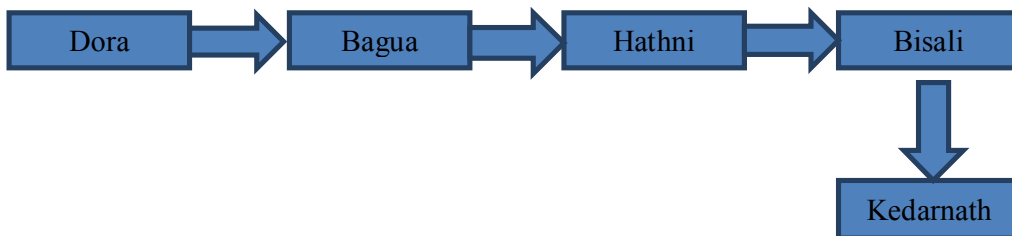


**Alternate Routes which are proposed:**

**Route:-1 (Government started working on it)**



**Route:-2 (Fairly Dense Jungle)**



These were the routes which have been provided by Mr.Santoosh Kumar, With this he also provided some valuable information like Different Forces has been made specially for the disaster such as State Disaster Relief Force, District Disaster Relief Force, Block Disaster Relief Force is been established by the government. From his point of view the Helicopter is the main for evacuation at the mountains.

He also told us that minor cases were brought to the Guptkashi by Helicopter but the major(Serious)cases were brought directly to Dehradun.

He also marked a major cause which leads to a huge loss of life in the Kedarnath disaster which is strike by the local people for the yatra through helicopters should be stopped.

## **Interview with Mr.Rinku Thapa:-**

**Designation:** Deputy Commandant ITBP (Indo-Tibetan Border Police).

**Date:-22/04/2014**

This interview Of Mr.Rinku Thapa was our Fifth Interview which provided us some usefull information about our research work but it was an restricted interview, Due to ITBP norms he was unable to tell us the vital information because of confidentiality. So we were unable to get the alternative routes from ITBP though he told us Helicopters are the major alternatives including ropeway. But some suggestions are been given by him for the better management and evacuation process to tackle with any future natural calamity were very essential which are:

- Locals can be approached to get alternative routes by the government and its officials.
- Identification Marks on the Mountains should be marked for eg: Flags, Arrows, Numbers etc.
- Temporary Helipads should be developed with in that region in the plain safer areas.
- Information System should be made which has map of the region with alternative routes specified to increase the awareness of the routes.

He also told us some real statistics about Kedarnath Disaster of ITBP such as:

- Total affected pilgrims/locals – More than 1 lakh.
- Rescued by ITBP – More than 32000.
- Shelter/food provided to – More than 5300 civilians.
- Medical Treatment given to more than – 5700 civilians.
- Troops of ITBP engaged in Rescue & Relief operation – 1600.

**Challenges and Difficulties during Operations:-**

- Lack of information about actual situation.
- Extremely harsh climate, Intermittent rain, Unhygienic working conditions and Inhospitable terrain.
- Inaccessible route to disaster hit area and total dependence on air routes only.
- Rescue Troops, Equipments and luggage scattered in various locations.

**Suggestions for future:-**

- Detailed Inventory and mapping of glacier, Pro-glacial and peri-glacial lakes along with their potentiality.
- Mapping of landslides hazards in the lower reaches.
- Restrictions on the movement of pilgrims in all shrine areas.
- Timely warning system.

He concluded by saying certain things:-

- Crisis management may require.
- Preparation -
  - ✓ Anticipation
  - ✓ Scenario Building Exercise should be done regularly.
  - ✓ Experience Drawing.
- In unique situations there should be an immediate response.
- Synergizing-
  - ✓ Identification & Involvement of key players in planning & operations.
- Role Clarity-
  - ✓ As an Institution.
  - ✓ Within the institution.

- Resource Mobilization-
  - ✓ As per planning.
  - ✓ Use of Local Resources.
  - ✓ Control room.
  - ✓ Media.
  - ✓ Public.
- Response as per laws.
- Training-
  - ✓ Simulation Exercises.
  - ✓ Drills.

These are some of photos which is been shared by Mr.Rinku Thapa, which shows how ITBP has implemented the evacuation operation at the time of Kedarnath disaster.



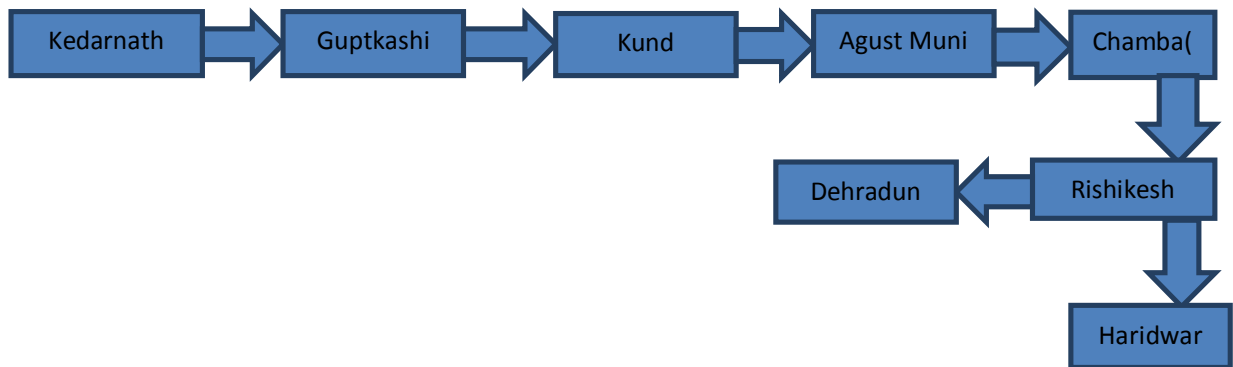
**Interview with**

**Designation:** Manager (Technical), Disaster Mitigation and Management Centre (Central Secretariat), Dehradun.

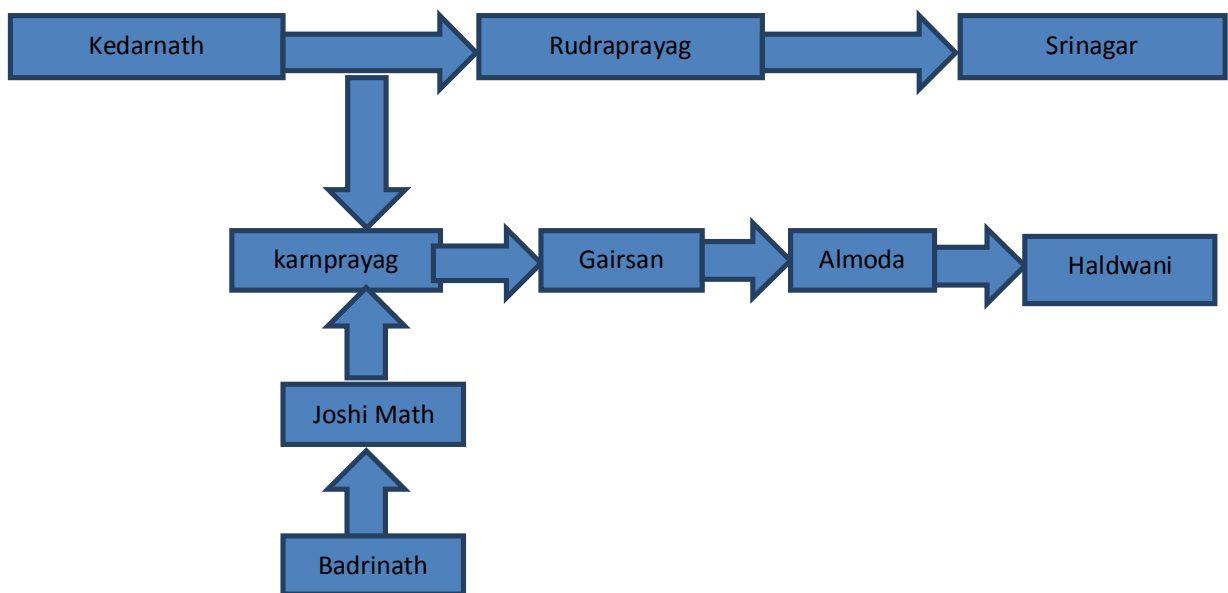
**Date:-23/04/2014**

Interviewing Mr. was a great experience, He provided us with many important additional information including the alternative routes. The alternative routes which he given us are:-

**Route:-1**



**Route:-2**



## **About Warehouses in Uttarakhand:**

Mr. gave us information about warehouses in Uttarakhand for emergencies. Warehouses in every district are been proposed to be built in every district for emergency stocking.

**Central Warehouse** is been proposed to be made in Dehradun for catering the need of Uttarakhand in case of any future natural calamity.

## **About Doppler Radar Implication:**

According to him there are three Doppler radar for weather forecasting costing around 3-4 Crores are been proposed by the government but due to some land issues they are not been implemented till yet. There are three expected cities in which the three Doppler radar will be fixed which are Mussoorie, Nanital, Uttarkashi but these are not finalized.

He has also given some challenges and suggestions in case of natural calamity:-

### **Challenges:**

- Communication Problems.
- Logistics Support
  - ✓ Need Assessment (Requirements).
  - ✓ Demand Forecast.

### **Suggestions:**

- Early warning system should be there.
- Warning should be location based.

He also suggested us that the tracks should be marked on the mountains for emergency evacuation like making arrows on the trees guiding the route for easy evacuation or by just numbering the trees.

So this was all about the findings which we have gathered from the experts, we are heartily thankful to the experts and all the other respondents for their kind responses.

## **CONCLUSION**

In the end to conclude, the efforts made by government are not enough and the decisions made are not relevant. Therefore the alternative routes framed by the government are tough to implement since the mountain ranges are too steep. With our research we found that the routes which was destroyed earlier by this disaster on 16<sup>th</sup> and 17<sup>th</sup> June 2013 haven't been repaired till date, therefore the government is not taking new initiatives for building new routes.

The routes which we have mentioned in our research project can be very useful to provide effective evacuation and saving thousands of life by further development. The disaster management department of Uttarakhand has taken some initiatives but these do not contribute towards the development of alternative routes. The management of the Disaster Mitigation and Management centre is in a dilemma that what should be done for the future to prevent these type of natural calamity.

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