Uttarakhand Disaster 2013
Lessons Learnt

Dr. Anil K. Gupta,
Head, Divn. of Policy Planning,

Tapash Saha Roy,
Consultant,

National Institute of Disaster Management
New Delhi
NIDM team of faculty members - Dr. Satendra, Prof. C Ghosh, Dr. A K Gupta, Dr. Surya Parkash, Dr. V K Naik, Mr Tapash Saha Roy, Ms. Sreeja S Nair, Dr. AD Kaushik, Mr Manas Dwivedi, Mr, Ashok Sharma, etc.

Reports/interviews, publishes documents, news items, research publications, inputs/communication from Govt. Departments, NGOs/community, Survey inputs, Academic/research institutes, etc.
The Kedarnath temple site is just a short distance from the snout of two mountain glaciers, as this image from 50 years ago suggests development has occurred in an entirely haphazard manner. Pre-disaster images suggest development has occurred in an entirely haphazard manner.

The Kedarnath temple surrounded by buildings.
The level of destruction of the temple town by the debris flow was very high, and was quite shocking.
HAZARDS IN Uttarakhand State

Natural hazards like earthquakes, landslides, avalanches, cloudburst, hailstorms, glacial lake outburst floods (GLOFs), flash floods, lightning, forest fires, etc. have been known to cause major losses to life, property, resources and ecosystems in the region and thereby affecting its process of economic development.

Due to its geo-climatic, ecological and socio-economic settings, Uttarakhand is one of the most disaster prone States of the country.
Probable causes of the disaster

The excessive rainfall probably caused by fusion of westerlies and monsoon clouds. The State was hit by ‘heavy’ (64.5-124.4 mm) to ‘very heavy’ (124.5-244.4 mm) rainfall.

- Breaching of Chorabari lake near Kedarnath temple:
  
  - Rivers carrying higher amounts of water due to continued widespread rains for previous 3-4 days
  - Disaster Vulnerability increased by heavy influx of Pilgrims
  - Increase in snowmelt due to warm monsoon rains added to increased runoff.
  - A possible Lake burst added to the impact.
Two events as suggested by Wadia Institute, Dehradun.

Event 1 – “On 16 June 2013, at 5:15 p.m., the torrential rains flooded the Saraswati River and Dudh Ganga catchment area, resulting in excessive flow across all the channels. The meteorological stations near Chorabari glacier recorded 325 mm rainfall at the base of the glaciers in two days on 15 and 16 June 2013.

Event 2 – “The second event occurred on 17 June 2013 at 6:45 a.m. It was caused by overflow and collapse of the moraine dammed Chorabari Lake which released large volume of water that caused another flash flood in the Kedarnath town leading to heavy devastation downstream.
Impact of the Disaster

The districts of Bageshwar, Chamoli, Pithoragarh, Rudraprayag and Uttarkashi were the most affected.

The worst impact of the disaster events of June 2013 on human settlements was in the Kedarnath shrine area (Gaurikund to Kedarnath), the Mandakini valley, the Alaknanda valley (at Gobindghat and upstream), the Pindar valley, and along the banks of the river Kali in Dharchula area.
Impact of the Disaster ......

Irreparable losses in terms of human lives, damage to private properties and public infrastructure, damage to landscape and ecosystems, livelihoods and local entrepreneurships.

> than **nine million** people **affected** by **flash floods** disaster.

In terms of human casualties, **several people died** and over **4,021 people** were reported **missing** (presumed to be dead).

- 4,200 villages were affected;
- 11,091 livestock were lost and
- 2,513 houses completely damaged.
- More than 70,000 tourists and 1,00,000 local residents were stranded in the difficult mountain terrain of the upper reaches of the Himalaya
Weaknesses in state of disaster management as reported

Incident Response System?
• Issues of co-ordination and administration at different levels

Dissemination of Early warning
• Appropriate interpretation of Met forecast and risk communication

Capacity to manage large-scale Disaster
• Trained and dedicated human resources,
• Maintenance of alternate evacuation routes,
• Search and rescue facilities and
• Community preparedness
• Disaster management system and preparedness at local levels
Development issues

• Inappropriate hill area development including *unscientific construction of road and buildings, infrastructures, hydro-projects, utility services*

• Illegal *encroachment* taking place along the rivers (Since 2002 there has been a ban on building within 100 meters of the river bed which is often violated)

• *Human activities* like deforestation, river bed mining, quarrying, blasting, drainage disruption, slope modification etc

• Greater emphasis on *commercial / tourism / infrastructural development* since the formation of Uttarakhand

• *Dissonance/imbalance in the environment/ecosystems.*
Lessons learnt - Disaster Mitigation and Development

Land use Planning

Implementation of “Flood Plain Zoning” regulating construction within the flood plain of a river.

Legal framework needs to be developed to avoid construction on unstable or steep slopes and ensure land use planning based on Hazard, Risk and Vulnerability studies.

Encroachment in riverbeds must be strictly prohibited and all past encroachments must be immediately removed.
Lessons learnt - Disaster Mitigation and Development .....  

Hydro-power projects

- Along with the Environmental Impact Assessment (EIA), hydropower projects in ecological sensitive regions like Uttarakhand must have comprehensive Disaster Impact Assessment (DIA) mandatory for project clearance.

- **Hydroelectric projects** must have a **muck disposal plan**, with proper site for muck disposal, and plans for transportation of muck to the designated sites well above the high flood levels.

- **Alternative energy** options like solar / wind / bio energy need to be further explored in the Himalayan region.
Lessons learnt - Disaster Mitigation and Development...

Landslide management

- **Landslide risk micro-zonation** using ground truth of landscape, geology, ecology, vegetation, soil characteristics, human settlements, landslide and flood history of the site.

- **Appropriate guidelines**, regulations and codes for landslides risk assessment and mitigation through an integrated approach, involving State agencies/departments and local administration.

- **Blasting for developmental activities** must be avoided because frequent blasting may destabilize the weak rocks of the region, which may result in landslides and rock falls
Lessons learnt - Disaster Mitigation and Development...

River Bed Mining

River Bed Mining related issues are to be tackled systematically, based on the scientific investigations, taking care of ecological aspects.

The issue needs an area specific approach before giving lease for River Bed Mining.

Unsustainable mining of the riverbeds must not be allowed and illegal mining must be stopped immediately.
Lessons learnt - Disaster Mitigation and Development...

Road Construction

- Review the **alignments of existing roads** in consultation with scientific agencies.

- In view of the importance of roads connecting pilgrimage centres and sensitive border areas, a **Programme for construction of new roads**, and **widening and renovation** of existing roads should be undertaken in a **scientific manner**.

- **Separate evacuation routes/roads** to be constructed from major pilgrim centres, even if they are for short stretches.
Lessons learnt – Preparedness

Disaster Mitigation Plans and Policies

Need to develop/revise and update/improve Disaster Management Plans at District/local levels, ensuring

(i) adequately detailed HRVC analysis with clear approach of vulnerability assessment,
(ii) risk mitigation plan with clear time-frame, roles and responsibilities, and mechanism of integrating DRR/mitigation measures into departments plans/schemes, and
(iii) a functional operational structure and establishing a clear and accountable process for all disaster preparedness efforts.

Take into consideration the effects of climate change, ecological and natural resources, livelihood and local development issues.

Need to develop Standard Operating Procedures (SOPs) for mitigation, preparedness and response in case of all major disasters with assigning duties and responsibilities to key role players and stakeholders.

Capacity building of all the stakeholders in disaster management, especially of main role players, is essential for effective response.
Lessons learnt – Preparedness

Reliable Telecommunication System

Augmentation of wireless, satellite and ham radio communication system for carrying out effective response and rescue operation in case of a disaster. Provision of battery operated or solar mobile chargers in disaster prone areas.

Review existing emergency communication system. An alternative back up communication system for use in case of failure of normal communications during disasters.

For emergency alerts, some effective network like Short Messing Service (SMS) Gateway system must be used to alert and warn people in case of disaster.
Lessons learnt – Preparedness

Early Warning System

A review of the existing weather forecasting and information systems is necessary. Accuracy of the disaster warnings, communication with local authorities, hydro-met data collection, and sharing capabilities should also be targeted for improvement.

Establishing advanced automated early warning system (EWS) for inaccessible parts of the catchment areas on a permanent basis is highly desirable.

Investments in monitoring weather, glacial lakes, and river flow is fundamental for improving the accuracy of risk mapping.

Coordinated action of all EWS related public agencies under one umbrella organization can improve monitoring, warning, preparedness and response.
Lessons learnt – Preparedness

Tourism

While using the riverbanks in the region for any type of habitation, construction, or developmental activity, it is essential that river history and other information related to past disasters be taken into account, so that these spots do not become death traps for tourists and pilgrims. Besides, ecological, slope and drainage characteristics of upper reaches should also be taken into account.

While planning for tourism related developmental activities, besides environmental and socio-cultural issues, the carrying capacity of tourism sites should also be kept in mind.

There must be provision for registration of pilgrims and tourists entering the ecologically sensitive areas to effectively regulate the tourist influx.
Lessons learnt – Preparedness
Training and Capacity Building

Exhaustive training on various aspects of disaster management for all the stakeholders and role players is inevitable.

The training should include various aspects such as approaches and means of disaster risk reduction, development of DM Plans including HRVCA, mitigation and preparedness plans, incident response system, structural & non-structural safety in hospitals and schools, rapid visual screening of buildings, search & rescue operations, psycho-social care, techno-legal issues, ensuring housing safety, shelter, food security, etc.

It is essential that the State government reviews its training strategy and strengthens its training capacity. There is a need to develop area specific training strategies and training modules based upon a detailed “training need assessment” study.
Lessons learnt – Preparedness

Availability of Essential Supplies

Lack of connectivity and transportation becomes a major challenge during disasters in hilly terrain and, therefore, there must be provision for stocking essential items like food grains, blankets, medicines at block and panchayat levels for emergency purpose.

A storage network along with built in shelters for providing food to the stranded people needs to be established.

There must be some flexibility in procedures for procurement of essential items during emergency situations.

Administration must also plan for and take effective steps to check black marketing of essential commodities during disaster situations.
Lessons learnt – Preparedness

Utilization of India Disaster Resource Network (IDRN)

IDRN may be regularly updated in the database which is crucial during the disaster event. This website is readily available for information about equipment and human resources required to combat any emergency situation.

The database in IDRN also enables Disaster Managers to assess the level of preparedness for specific disasters.

Facilitated readily available and up-to-date information on various resources required for efficient and timely response during emergencies and disaster preparedness.

District Collector / Magistrate is the authorized officers for facilitating data collection and updation at the district level.
Lessons learnt – Response & Relief
Unified Management of State Disaster Response

During the Uttarakhand disaster, necessity of proper functioning and coordination of SDMA / DDMA and other agencies involved in disaster response and relief clearly emerged as an important aspect. SDMA / DDMA should formulate contingency plans and conduct regular mock exercises as this will ensure effective response in the eventuality of a disaster.

Government must take all necessary steps to incorporate IRS into its response mechanism.
Advice of Army, IAF and also of geologists should be taken by State Government to identify such locations and *develop all weather helipads*.

All disaster prone areas which have high concentration of population, like Kedarnath and Badrinath, should have *alternate routes available for evacuation*, wherever feasible. These routes must be identified and maintained by the State Government.

Disaster Response plans of the State must cater for *logistics set up* required in the Disaster affected areas. These plans must cater for reserve stock of rations, supplies and fuel pre-located at critical locations.
Lessons learnt – Response & Relief

Search, Rescue & Evacuation ….

The NDRF faced problems in carrying their heavy equipment in difficult terrain. There is a need to provide *equipment suitable and easily transportable for search and rescue operations in hilly terrain*.

The retired personnel of armed forces may be provided necessary basic training in search and rescue and their services may be used for disaster management related activities like search and rescue and awareness and capacity building of local communities etc.

The data on IDRN should be kept updated and regularly be used for providing necessary resources during disasters.
Lessons learnt – Response & Relief

Non-Governmental Organization

The State level response should more effectively integrate the contributions of volunteers and non-governmental organizations into the broader State level effort. If planned prior to an emergency situation, this integration would be best achieved at the district and local levels. In particular, State and district administration must engage NGOs in the planning process, credential their personnel, and provide them the necessary training and resource support for their effective involvement in a joint response.

For effective coordination with NGOs and other voluntary agencies, the State Government should appoint an officer as Nodal Officer in each district of Uttarakhand. Nodal Officer should also maintain database of active NGOs in each district with their contact details and areas of intervention.
Lessons learnt – Response & Relief

Psycho-Social Care & Traumatic Stress Management

There is an urgent need of trained volunteers for psycho-social support in the aftermath of disasters. Trained volunteers can be mobilized to provide psycho-social support to affected population in such eventualities.

Psycho-social support should be integrated into the overall medical treatment of disaster victims.
Lessons learnt – Response & Relief

Critical Health Care

In coordination with the Department of Disaster Management and other emergency support functions, the Department of Health should strengthen State Government’s capability to provide public health and medical support during a crisis situation.

*Medical relief plans should also be dovetailed into disaster response plans* and resources earmarked accordingly.

Though the deployment of hundreds of ambulances during the disaster proved very effective and useful in saving lives, yet their mobility and effectiveness was hampered due to frequent road blocks. As a result many patients were taken on shoulders across the road blocks under very risky conditions. There is need to equip Response Teams with adequate number of air ambulances for immediate medical care in difficult terrain.
Thank you