
Good Practices in Landslide Risk Management – An Example from Uttarkashi, Uttarakhand State, India

India

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Uttarakshi is a border district – the abode of the holy river Bhagirathi, a pilgrimage place and a picturesque town that attracts huge numbers of tourists, trekkers and pilgrims. It is located in the fragile Himalayan belt (Seismic Zone – V) and has bitter memories of disasters in its history. Some of the more recent events include the 1803 earthquake; the Bhagirathi flash floods (1978) which had a devastating impact; the Gyansu Nala landslide (1980) that claimed 24 lives and destroyed several houses; the Uttarkashi Earthquake (1991) that caused the loss of 653 human lives, injuries to about 6000 people and the death of 1300 head of livestock in addition to damage to buildings, other structures and the infrastructure. However, the town's population and development are on the rise, thereby increasing its vulnerability and risks due to such disasters. In the past, the town had an unwritten regulation that most of the houses had to be built about 300m away from foot of the hills. But lately, this has been overlooked and a large number houses have been built on or close to the foot of the hills.

A disastrous landslide took place on 24 September 2003 in the Varunawat Hills in Uttarkashi. It engulfed three 4-story hotels and damaged several buildings, roads and other infrastructure. The estimated damage were to the tune of about 50 million dollars. However, there was no loss of life despite the fact that about 400 buildings were declared at risk after this landslide. The landslide generated debris of more than half a million cubic meters. The height of the landslide was more than 500m and the affected area was approximately 2 sq. km. The landslide remained continuously active for a period of about one month, up to 20 October 2003.

The paper aims to highlight the fact that despite the extreme conditions at the site due to the Varunawat Landslide, the district administration and other government agencies were able to save the lives of people who were at risk from this devastating event. The community as well as the administration/government agencies was aware that a large ground crack had appeared in the hills after the 1991 earthquake and one of the landslide shoots was active in the past even before this earthquake. Hence, experts from various academic, research and field agencies were consulted by the district administration to find a solution. Although no concrete steps were taken after the recommendations from the experts, the administration remained vigilant in regard to the problem.

Expert teams had visited the area just about a month before the actual incident happened and informed the district administration about the potential impact of this possible landslide. The area was delineated and people were informed about the impending danger with the help of print and electronic media as well as with support of the district administration and community workers. The forewarning of the landslide alerted the people at risk and they were able to evacuate the affected building in a timely manner before they could be buried or injured by the landslide. The photograph below shows a panoramic view of the Varunawat Landslide just a day before and a day after the landslide engulfed the buildings at the foot of the Varunawat Hills.

It would also be worth mentioning here that a landslide susceptibility zoning map of this area published by National Remote Sensing Agency in the year 2003 had also marked this portion as a zone highly susceptible to landslides. The field visits by the experts and the mapping process prior to the landslide helped to protect people's lives and created a better response to the landslide by both the affected community as well as government agencies/administration.

Thus, good practices in landslide risk management must include pre-emptive mapping of zones susceptible to landslides and their monitoring with field observations (particularly when the area is affected by some triggering events like earthquakes, prolonged rains or short duration intense rainfall) to alert the community at risk and

suggest preparedness/response actions to the local administration. Appropriate timely action by all these stakeholders (scientists, administration, community and others) will help reduce the disaster risks and losses.



Photo 1a. Landslide site just a day before the burial of these hotels, 25 September 2003



Photo 1b. Landslide site after the burial of hotels, 26 September 2003

– **Background**

A large crack appeared after the Uttarkashi earthquake (1991) and a disastrous landslide was expected to happen in the town of Uttarkashi and in locations close to the district headquarters

– **Objectives**

To understand the possibility of landslides; to recognize the area, buildings and structures that may be affected; and to manage landslide risks and control their impact.

– **Term/Time frame**

1 month

– **Activities undertaken**

- (i). Geologists make a field visit and observations, then hold discussions with the district administration to inform them about the impending danger.
- (ii). The administration alerts the potentially affected community and disseminates the information through the media. The district administration gears up for evacuation and response. Efforts are also made to keep the panic level low.
- (iii). The affected community becomes aware of the potential risk, gathers its valuables and gets ready for evacuation on short notice.
- (iv). Both the community and administration remain vigilant whenever boulders fall and they try to prevent injuries or loss of life.
- (v). The affected community evacuates the buildings before the buildings are buried by the landslide and thus lives are saved. Local administration helps in providing temporary shelters and other support.

– **Major achievements**

Zero casualties / no loss of life

– **Total budget**

Not known

– **Contact details**

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