

Natural and Anthropogenic Impact over Kedarnath Area, Uttarakhand

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Abstract: Studies on the geomorphologic problems of the upper Ganga Basin area have been carried out by some eminent Earth scientists and environmentalists since the thirties (Auden 1934). There are many rock sequences exposed over upper Ganga basin like MBF (Main Boundary Fault) and MCT (Main Central Thrust). Also this place is famous for its pilgrim centres and some. Confluent points of rivers like Rudrapur (Holy confluences of river Alakananda and Mandakini), is my study area. Tourism is the biggest income way and also threatened version for this place



because of -unethical and illegal construction of hotels, inn or guest house, so my study guide and helps human to overcome the perils for the next generation.

Key words: MBF, MCT, Meandering Belt.

Introduction: Rivers are considered to be a dominant and energetic multi component system which changes according with the time and five mentioned factors like -

- (i) Geochemical behaviour of elements,
- (ii) Lithology, (iii) Weathering rates
- (iii) Biological processes (v) anthropogenic activities, can impact over the land use changes. Physical factors are less responsible than anthropogenic factors because of unscientific tourism activities. Cross section view of Rudrapur (Meeting Point of Alakananda and Mandakini River)

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Proves that shifting of river valley may cause damages the past construction. In the other side construction of hotels over frazile structure makes the area more landslide prone and also contamination of surface water is another human induced hazard of the study area.

The study of slope instability, fault zone and landslides are more present valuable subjects. The purpose of this study is to identify the physiographical risks of this area with the correlation with the tourism and human construction.

Study Area and Methodology: The confluence of two major tributaries Alakananda and Mandakini get its name of Rudraprayag. The two rock sequences sandwiched between North Almora Thrust (NAT) and Main Central Thrust (MCT) constitutes the lesser Himalaya and main places of this district.

The study area is located between the latitudes $30^{\circ} 43' 53''$ N to $30^{\circ} 17' 21''$ N and between the longitudes $78^{\circ} 58' 13''$ E to $79^{\circ} 03' 9''$ E. The entire area is located within the Rudraprayag district of uttarakhand state. The river Alakananda flows from the North-east to south west part which joins the Tributary comes from chorabari Glacier Near Kedarnath, Mandakini (Means, she who flows or comes gently) at Rudraprayag.

For purpose of field study I have taken three types of methodology, prefield, field and post field. In the prefield section collection of topographical maps, data and images (also from Google earth) is so important. Another section is field which is completed by the measuring some physical parameters and also house hold basis survey. At last section the analysis of the data. Collected from field work is preferable.

RESULT AND DISCUSSION : (geomorphic evolution of kedarnath area)

My aim of study is discussion about the polycyclic features of fluvial and glaciofluvial landforms and relate it to the modern construction system.

1. **FLUVIAL AND GLACIOFLUVIAL LANDFORMS:** It seems possible that the combined flow of water i.e. rain fed and glacial fed during the south west monsoon period is found to be responsible for the occurrences of vigorated fluvio erosional activities.

2. **PHYSICAL CHARACTERISTICS:** The holy river Mandakini finds its way through the gorges, canyons and incised meandering course down stream.

The striking geomorphological features observed by me -

" Greatly Incised valleys with several evidence of the rejuvenation in its course.

- " Series of rapids and cataracts across the rejuvenated Bhagirathi valley.
- " A series of conspicuous river terraces both of the cut fill terraces along with the anomaly in the matching of the heights of opposite banks.

GEOMORPHOLOGY AND SOIL: Himalayan ranges lies the considerably denuded and rugged terrain of inner lesser Himalaya characterised by many transvers spurs, besides moraines, plains, fault and thrusts are the other geomorphic units commonly observed in Rudraprayag

PROBLEM OF THE STUDY AREA:

NATURAL PROBLEM:

From the time of kedarnath's Temple establishment (Around 8th century by " Adi Shankaracharya") It may face many natural problems those are.

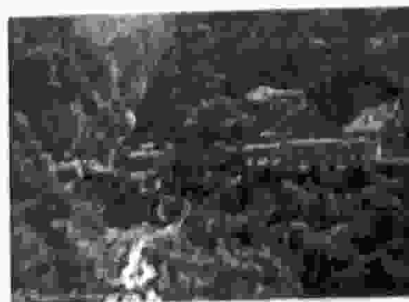
(i) **Glacier Flow :** We have overcome Little Ice Age considered to have taken place between 1300-1900 AD when the temple became a part of the glacier. According to the scientists of Wadia Institute of Himalayan Geology, Dehradun, Kedarnath temple Survived being buried under the snow for almost 400 years.

(ii) **WEATHER CHOROLOGY:** Now-a- days the devastating rainfall increase before than other days. In the year 2013 on June 14 the monsoon front advanced right across Uttar Pradesh and the western regions to cover the entire the country by June 15, exactly a month ahead of its normal date of July 15.

(iii) **SHIFTING OF STREAM COURSE:** Kedarnath is situated on the river bed of Mandakini River (at the height of 3583 metre). According to geomorphologist when Mandakini's meandering Belt extends its way kedarnath temple has been washed away.

Anthropological Problem:

(i) **Over Tourism :** Over years pilgrim centres attract tourist from the different corners of the country .But their way of life in these centres may cause hazardous problems like pollution, overcrowding, transport problems etc. Kedarnath also suffers above like problems



(ii) Risk factors: Now Roads and increasing of transport are the major destabilising factor for the kedarnath. In the year of 2005-06,83,000 odd vehicles were registered in the state. The figure rose to nearly 1,80,000 in 2012-13. So it is an established fact that there is a straight co-relation between tourism increase and higher incidence of landslides.

(iii) Threat from dams : The central Electricity Authority and uttarakhand power department have planned 70 odd projects on Ganga and its tributaries which will such extent affected 80 percent of Bhagirathi and 65 percent of Alakananda .This change may caused damaging for rains.

(iv) FREQUENCY OF LANDSLIDES: The unplanned development may cause life risk as the triggering up of landslides. Engineers coming from the outside do not properly know about mountains, beside heavy machines which are transported along the kutcha roads, have weakened it. So the facts of landslides increase than before.



Kedarnath, Now (After Disaster)

CONCLUSION:

Kedarnath is a town located in the Indian state of Uttarakhand and has gained importance because of kedarnath Temple, but this region is seismically and ecologically very sensitive and delicate, even a minute changes (anthropogenic or natural) can create a dangerous disaster. Already a natural hazard has been happened in kedarnath valley due to torrential rainfall during 16 and 17 June, 2013. After viewing this disaster as a conscious researcher I hope my article may reveal the perils which will come quite naturally or anthropogenically. But some scientific steps may change the upcoming scenario and build up kedarnath more suitable for real nature lovers.

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