ABSTRACT

The Himalayas truly one of the most outstanding yet fragile ecosystems of our planet constitutes one of the most threatened life-support system on the earth today. The Pir-Panjal range a group of mountains situated in the inner Himalayan region is no longer left untouched by the development fever depicting the consequences of the same in the form of landslides, soil erosion, climate change and loss of biodiversity. Of them landslides is the most common and conspicuous environmental hazard prevailing almost every year in the study area. Occurrence of landslides not only disrupts the environmental equilibrium but also checks and retards the overall development of the area. The Pir-Panjal range is under threat due to constant occurrence of landslides caused by natural and anthropogenic mechanisms. Therefore, the management of such an environmental hazard has become one of the prime importances in the pursuit of human development. In this study, an attempt has been made to find out the landslides affected areas in the Mughal road in Poonch district. The possible factors triggering the landslides and need for checking of landslides have also been discussed.

KEYWORDS: Landslides, Pir-Panjal Himalayan Range, Environmental Management

MATERIALS AND METHODS

Study Area

The present study area is Behramgala-Chattapani-Peer Gall lies in the Poonch district of J&K State. It is one of the frontier remote districts of the State situated on the line of control surrounded by Kashmir valley in the north-east; district Rajouri in the south and Pakistan occupied Kashmir (POK) in the west. Poonch is separated...
On several occasions the survey was conducted to study the mountain slope characteristics and gently sloping valleys were observed for their macro-morphology and vegetation cover. Relevant still photography of the desired sites was done with the help of the digital photographic camera (Sony make). Landslides prone areas were identified and probable causes noticed. Additional data and information has been collected from literature, local folks and from fields by the authors themselves.

Methods of Analysis

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Observation and Discussion

The ecosystems in the Himalayas have recently been the focus of attention of a number of multi-disciplinary and problem specific studies. The study area, Pir-Panjal is one of the environmental hazard prone areas not only in the J&K State but also in the country as a whole. Human interference in this virgin land started during the Mughal rule when Mughals preferred and selected the area not only as a health resort but also for various sporting activities. Since then, the pressure of population in the virgin forest land had been increasing decade after decade and century after century. Behramgala-Chattapani-Pir Ki Gali Road, the
The environmental degradation has been quick in these areas because of the poor quality of soil and also due to increased demands on fuel, fodder and food. Lack of environmental awareness due to low socio-economic status of the people living in these areas has made them their own enemy.

In the study area, the average slope starts from 150 and it reaches about 300 as we move from Balfiaz (Poonch) to the Peer Ki Gali Sector (Gupta et al. 1995). The influence of slope steepness on landslide occurrence is the easiest factor to understand as steeper slopes have a greater chance of land sliding. There are many factors which are responsible for instability of hill slopes. The variations in degree of these factors viz. nature of relief, bedrock regolith, drainage, earthquake and human interference (Cook and Deornakamp, 1990) effectively determines the intensity and spatial extent of slope failure. Landslides usually occur at unstable hill slopes. The factor stability and instability is determined by the factor of safety FS, where

\[ FS = \frac{\text{shear strength}}{\text{shear stress}} \]

If FS>1.0 than the stability is likely to occur and if

Figure 2: A Landslide Prone Area Along The Mughal Road Which Occurred Instantly As The Authors' Vehicle Crossed The Site
them are known as “margs”, the comparatively flat lands devoid of the tree growth and supporting a thick grass cover. Nomad grazers called gujjars and bakerwals own large herds of cattle and sheep (Figure 3), use there margs for grazing of their livestock. The pressure of grazing on the margs and the forest areas, adjoining these pastures is far above the carrying capacity of these areas which has caused rapid deterioration of the pasture lands, soil erosion and insignificant regeneration of forests on account of heavy trampling and browsing.

Heavy Rainfall and Precipitation

The study area is characterized by monsoonal climate where the rainfall starts from the month of July and continues till September. The average annual rainfall recorded was approx. 1500-2000mm. This study area also experienced precipitation in the form of heavy snowfall from October to March every year as is evident from shots which were clicked during October 2011 overland flow is a common phenomenon during rainstorms. This may have been due to precipitation intensities exceeding soil infiltration with consequently greater surface run off over the soils which has only reduced the slope stability but also caused slumping down of the debris and loose soil leading to landslides as witnessed at Maansar (Figure, 2).

Anthropogenic Activities

Besides the natural causes various anthropogenic activities noticed at the study area which can also be held responsible for the landslides in this sector includes: Over Exploitation of Natural Resources

These includes not only the authorized extraction of timber for generating revenue for the state but also the clandestine plundering of forests by various agencies like villagers, contractors and the nomads who use this area for grazing of their livestock resulting in the destruction of the tree cover. Trees have an essential role to protect soil and water and preventing the landslides to a great extent because of the reason that the trees leaves act as a shield to the incessant rains and the rain water seeps down into the roots and protects the soil from being loosened.

The hilly slopes made bare of tree cover as discussed earlier, are subjected to the torrential rains, which the soil devoid of vegetation and tree cover are not in a position to hold and as such water passes in great force uprooting scarce vegetation, boulders and topsoil thus creating erosions, landslides and floods. Along the Mughal road, the green pastures predominate and such grazing lands situated at high altitudes within coniferous forests or above

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Figure 3: A Nomad Along With A Flock/herd Of His Livestock Another Anthropogenic Pressure On The Natural Resources Along Mughal Road

Figure 4: Infrastructural Development Along The Mughal Road For Recreational Purpose
The sinking of the Chattapani is attracting the attention of the experts where, the road is sinking and the area ploughed to maintain the road. During rainy season it is a usual sight to see the pink muddy torrential rivulet coming from this site on all sides as the tree cover has almost crumbled and the soil binding and water holding capacity has collapsed. The exploitation of forest for timber and fuel is going unabated. The timber and the firewood which is sold in most private organized sale depots in Jammu and the innumerable kilns run on Jammu-Poonch route and Jammu-Pathankote route for production of wood charcoal and brick is a sufficient proof of the greater devastation of the forest cover in the region.

It is an undesirable fact that society has to play a greater role in preventing exploitation of the forest resources of the state and protect the environment from fast degradation. It may be mentioned here that the environmental holocaust in the Himalayan range by man will ultimately destroy us and, therefore, it is very necessary to save the Himalayan environment not only in our own interest but also in the interest of our future generations to come.

REFERENCES
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