

**ABSTRACT**

The aim of this study is debris flow risk zonation using geological and hydrometeorological indicators in district Chitral, Hindukush Region Northwest Pakistan. The research is based on secondary data. Multt criteria Analysis (MCA) in Geographical Information System (GIS) environment was used to achieve the objective of the study. The geological and hydrometeorological parameters were analyzed by making five classes of each parameter. The classes are ranked as most favorable and least favorable with numerical weights. The weights were assigned in accordance to their importance in debris flow occurrence. Then weighted overlay analysis techniques were applied to develop composite map representing the importance of each factor. Debris flow risk zonation map was resulted into four classes very high risk zones, high risk zone, moderate zone, low risk zone. The geology of the study area is diverse with frequents earthquakes. Similarly the forest cover is decreasing due to anthropogenic activities. The area is also characterized by long cold winters with frost action. These factors are destabilizing the slope. During summer season rain storm event results high surface runoff and peak discharge in the perennial and non-perennial channels which results flood and debris flow. These events result human life loss and disruption. The main villages located in very high risk zone are Mulkoh, Mastuj, Reshun, Shegram, Terich Gol, Rogar, Asurat, Boni, Brep and Rech Tockhow. They have been frequently affected by hazard in the past decade. Out of the total area, very high risk zone is expanded over 8%, high risk zone is expanded over 16%, moderate risk zone is 29% and the rest is low risk zone. This study has highlighted the risk zones which will help disaster management authorities and policy makers to reduce the risk of debris flow in future.

Keywords: *Debris flow, vulnerability, multi criteria analysis, geographic information system*