MAPPING OF LANDSLIDE SUSCEPTIBILITY IN HATLON PROVINCE AND IN THE CENTRAL REGION OF TAJIKISTAN

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ABSTRACT: Tajikistan is located on the southeast of Central Asia and majority of population (93%) live in mountainous area which are vulnerable to several natural hazards such as landslides, mudflows, floods, earthquakes, avalanches, rock falls and droughts. Among these hazards, landslides and mudflows are the most dangerous, because more than 70% of all death recorded from 1997 to 2010 were caused by these two. Study area considered in this study covers 11.4% of the total territory of Tajikistan in which around 58% of the total population lives.

Landslide susceptibility mapping approaches are of two types; qualitative and quantitative. Qualitative methods depend on expert opinions whereas the quantitative method is driven by data and it can be of two types; deterministic and statistical. Deterministic modelling is based on slope stability theory and factor of safety is calculated. Statistical approach was used in this study, which uses weighted logistic regressions in order to calculate the probability of landslides occurrences. The ultimate goal of the logistic regression is to find the best fitting model that describes the relationship between the dependent variable (landslides inventory) and the independent variables (lithology, land use, slope, elevation, aspect, etc.). This method was used to calculate the weights as well as the difference between the positive and negative weights for each causative factor. ArcSDM (Arc Spatial Data Modeler), a software extension to ArcMap GIS package was used for the analysis. The difference was later used for rating the causative factors. This difference is positive for high influencing causative factors and negative for low influencing causative factors. Using this methodology, a landslide susceptibility map was produced, which was later categorized into different susceptibility classes to prepare a landslide susceptibility map. A proximity analysis was performed to assess the level of landslide exposure to neighboring villages in order to prepare a landslide exposure index.