

Landslide susceptibility modeling using geospatial technology: A case study of the Hunza-Nagar Valley, Northern Pakistan

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Abstract

Worldwide landslides are always a major concern in mountainous region, causing devastating impacts on infrastructure and human lives. Therefore proper mitigation strategies should be adopted to cope with landslide disaster. Landslide susceptibility mapping plays a pivotal role for landslide disaster management and planning. The aim of this study is to use weight of evidence statistical model in GIS to assess and develop landslide susceptibility map for Hunza-Nagar valley, Northern Pakistan. Seven input parameters i.e. slope, aspect, land cover, geology, proximity to road, proximity to fault line and proximity to stream network were used in the model. Slope, aspect and stream network were developed from ASTER DEM (30 meter resolution). Landslide inventory and land cover layer were developed from SPOT 5 satellite image (spatial resolution 2.5m, 2013) acquired from the Space and Upper Atmospheric Research Commission (SUPARCO). The geology and fault layer was acquired from Geological Survey of Pakistan (GSP). All the thematic layers were converted to raster format with cell size of 30 x 30 m resolution and thus the correlation of landslide and triggering factors were evaluated. Weights for each parameter were calculated through weight of evidence and overlaid to develop Landslide susceptibility index (LSI). Subsequently the LSI maps were classified in four different susceptibility zones and developed final susceptibility map. Finally, Success rate curve was used for validation of the model, which showed 75.3% of landslide occurred in 10% high susceptibility zone. It is found out that weight of evidence model for landslide susceptibility is very useful and valid.