



Landslide risk analysis using fuzzy logic based geospatial model and geoinformation techniques

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This paper deals with landslide risk analysis using remote sensing data and its utilization in a fuzzy logic model based Geographic Information System (GIS). Historical landslide extent and locations were identified from interpretation of aerial photographs, image processing of satellite images and field surveys. Topographical/geological data and satellite images were collected and processed using GIS and image processing tools. There are ten landslide inducing parameters are considered for the landslide risk analysis. These parameters are extracted from the spatial database that have been constructed such as topographic slope, slope length, aspect, curvature, catchment basin and distance from drainage, all derived from the topographic database; geology and distance from lineament, derived from the geologic database; landuse and landcover from Landsat satellite images; soil texture from the soil database; precipitation amount, derived from the rainfall database; and the vegetation index value from Landsat satellite images. Firstly, landslide hazard analysis was performed using landslide-occurrence factors employing fuzzy logic based probability model. Then the result obtained from the hazard analysis was used for risk analysis using the high hazardous zones and socioeconomic parameters. The results of the analysis were verified using the recently occurred landslide location data and compared with model output. The output risk map could be used to estimate the risk to population, property and existing infrastructure like transportation network.