LANDSLIDE SUSCEPTIBILITY ASSESSMENT BY APPLYING WEIGHT OF EVIDENCE METHOD FOR DISTRICT MUZAFFARABAD, NW HIMALAYAS, PAKISTAN

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Abstract
Northern Pakistan is prone to frequent and devastating landslides. This study develops a landslide susceptibility map using a data-driven approach for the district Muzaffarabad, northwest Himalaya mountain ranges of Pakistan. The Muzaffarabad district was severely affected by the 2005 Kashmir earthquake triggered landslides. Therefore, landslide susceptibility map is required to assess the distribution of landslides and accordingly mitigate their negative impacts. A landslide inventory was prepared from remote sensing imageries and 459 landslides were identified and subsequently verified in the field. These landslides were divided into training and validation samples for susceptibility assessment. About 321 landslides were used as training sites and compared with the nine selected causative factor to develop a landslide susceptibility map for the region. The selected causative layers include land cover, lithology, slope angle, elevation, distance to drainage, distance to faults, distance to roads, aspect and slope curvature and analyzed with the weight of evidence modelling technique to develop landslide susceptibility map. Spatial distribution analysis were also assessed. The validity of the developed susceptibility map was assessed with Success Rate Curve (SRC) while prediction efficiency was analyzed through Prediction Rate Curve (PRC). The validation results reveal fine compatibility between landslides and obtained posterior probability model of the area. The efficiency of classification is 89% and efficiency of prediction is 86.2%. To generate posterior probability, the Cumulative Area Posterior Probability (CAPP) curve was used to reclassify the continuous posterior probability scale map into four classes. According to the results of weights calculated through Arc-SDM, land cover, lithology and slope angle are significantly influencing the spatial distribution of landslides in the study area. The develop landslide susceptibility map can be used by the concern agencies to develop and implement landslide management strategies.
Keywords: Weight of evidence; Arc-SDM; Landslide susceptibility; Himalayas.