

A comparative assessment of prediction capabilities of Dempster–Shafer and Weights-of-evidence models in landslide susceptibility mapping using GIS

ABSTRACT

In a country with diverse geologic, topographic and climatic conditions such as Iran, landslides are frequent phenomena. The aim of this study is to perform a landslide susceptibility assessment at Haraz watershed, Iran using two different approaches such as DempsteróShafer and Weights-of-evidence models in GIS. First, a landslide inventory map was prepared using the landslide occurrence data by interpreting aerial photographs and field surveys. Second, thematic maps including lithology, altitude, and land-use are prepared in GIS. A total 11 landslide conditioning factors are considered such as slope angle, aspect, altitude, distance from drainage, distance from road, distance from river, lithology, land use, topographic wetness index, stream power index and slope-length (LS). The relationship between the conditional factors and the landslides were calculated using both Dempsteró Shafer and Weights-of-evidence models. Using the predicted values, landslide susceptibility maps of the study area is produced. For verification, the results of the analyses were then compared with the field-verified landslide locations. Additionally, the receiver operating characteristics (ROC) curves for all landslide susceptibility models were drawn and the area under curve values was calculated. The AUC value of the produced landslide susceptibility maps has been obtained as 72.87% and 79.87% for DempsteróShafer and Weights-of-evidence models, respectively. The resulting susceptibility maps would be useful for landuse planning and prioritization of efforts for the reduction and mitigation of future landslide hazards in Haraz watershed.

Keyword: GIS; Remote Sensing; DempsteróShafer; Weights-of-evidence; Landslides