

Prioritizing Effective Factors in Landslide Occurrence and its Susceptibility Mapping Using Shannon's Entropy Index

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(Received: July 29-2012 ; Accepted : June 26-2013)

Abstract

The objective of the current research was to prioritize effective factors in landslide occurrence and its susceptibility zonation using Shannon's entropy index in North of Tehran metropolitan. To this end, 528 landslide locations were identified using satellite images such as Geoeye (2011-2012), SPOT-5 (2010), and field surveys, and then landslide inventory map was created for the study area in ArcGIS environment. Data layers such as slope degree, slope aspect, plan curvature, altitude, lithology, land use, distance of road, distance of fault, distance of drainage, drainage density, road density, sediment transport index (STI), stream power index (SPI), topographic wetness index (TWI), normalized difference vegetation index (NDVI), surface area ratio (SAR) and topographic position index (TPI) were created and the mentioned maps were digitized in GIS environment. Prioritization of effective factors by Shannon's entropy index showed that the layers such as land use, lithology, slope degree, stream power index, and NDVI had the most effect on landslide occurrence. However, factors of topographic position index and plan curvature had the least effect. Also, landslide susceptibility zoning by the mentioned model and its accuracy assessment using relative operating characteristics (ROC) curve and 30 percent of landslide locations showed an accuracy of 82.83% with a standard error of 0.0233 in the study area.

Keywords: Landslide susceptibility, Shannon's entropy index, GIS, North of Tehran metropolitan.

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