Abstract

This research addressed the urgent need to develop decision support system models for the management of recurring landslides in the steep slopes of okemesi-ekiti in southwestern, Nigeria. Nine (9) landslide conditioning factors (LCFs) consisting of slope, drainage density, elevation, rainfall distribution, lithology, lineament density, bedrock topography, transverse resistance, and coefficient of anisotropy were derived from geophysical, geological and meteorological data sources. By exploring the inner fuzzy membership mechanism of the catastrophe theory (CT) model and the traditional analytical hierarchy process (AHP), the weights and ranks of the LCFs were computed. Weights evaluation using the CT model indicated that the traverse resistance has the highest weight contribution to landslide susceptibility, while coefficient of anisotropy has the least weight contribution to landslide susceptibility in the study area. On the other hand, weights evaluation using the AHP model showed that slope has the highest weight contribution to landslide susceptibility, while traverse resistance has the least weight contribution in the study area. The results of the weight assignments were used to produce the landslide susceptibility maps (LSMs) of the study area in GIS environment. The generated LSMs were classified into "very low", "low", "moderate", "high" and "very high" landslide susceptibility zones. Qualitative validation of the LSMs using the landslide inventory map showed that most of the landslide occurrences in the study area coincide with "moderate" to "very high" susceptibility zones. Furthermore, quantitative validation using Area unde the Curve (AUC) showed an accuracy of 74 % and 63 % for the CT and AHP models respectively.

KEYWORDS

Landslide Susceptibility Assessment, Catastrophe Theory, Geophysics, Remote Sensing, Landslide Conditioning Factors.