Spatial Multi Criteria Evaluation (SMCE) Model for Landslide Hazard Zonation in Kegalle District- Sri Lanka

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Landslide hazard is one of the most common hazards in many countries of the world including Sri Lanka. It is taken as a stratagem consideration in many countries all over of the world. Landslide hazard monitoring and prediction have been paid attention for all kind of scientific communities. Landslide hazard zonation (LHZ) is a very important content of landslide hazard prediction modelling. In Sri Lankan contest LHZ become more significant because 20% of the total lands threatened by landslides. The spatial distribution of landslides of the country mainly influenced by geospatial criteria, rainfall distribution, lithology, geology, hydrology, landforms, land-use and changes of land-use, slope angle, and drainage network. However, above factors are not equally contributed to determine the landslides susceptibility. Hence this study attempted to evaluate the level of contribution of those factors on spatial distribution of landslide hazard zonation in Kegalle District. In this study corresponding geospatial data were collected and convert into raster format having same spatial resolution for each criterion. Levels of contribution of each criterion were identified by Analytical hierarchy process (AHP), Weighted Linear Combination (WLC) and spatial multi-criteria evaluation (SMCE) models in GIS-based environments. Finally, weighted overlay operations were run to obtain the spatial distribution of landslide hazards. Landslide inventory maps prepared by national building research organization (NBRO) of Sri Lanka and satellite data were effectively utilize to validate the obtained results. The developed SMCE model was in acceptable level with 0.071 consistency ratio value ($p < 0.01$). Results concluded that the landslides not likely occur on 27% (469 Km^2) of the district. However, 35%, 27% and 9% of the area show moderate level of landslide hazard, expected landslide and landslide most likely to occur respectively. In addition, results revealed that the highest hazard zones observed in the land cover changes taking place from natural forest to plantations.

Keywords: Landslide, Susceptibility, geospatial , hazards