

Application of analytical hierarchy process (ahp) for Landslide hazard analysis (lha) in Kota Kinabalu area, Sabah, Malaysia

ABSTRACT

. A very good Landslide Hazard Analysis (LHA) model was developed using the Analytical Hierarchy Process (AHP) method for the area of Kota Kinabalu, Sabah. The AHP is defined as theory of measurement through pairwise comparisons and relies on the judgements of experts to derive priority scales that measure intangibles in relative terms. The derived priority scales are synthesised by multiplying them by the priority of their parent nodes and adding for all such nodes. Weighted value of different spatial factors from the best models calculated with the AHP method were derived. The results showed that the geology (27% variance), geodynamic features (14% variance), slope conditions (26% variance), hydrology/hydrogeology (14% variance), types of land use (3% variance), and engineering characteristics of soils (8% variance), and rocks (8% variance) play an important role in landslide susceptibility analysis. In terms of Landslide Hazard Map (LHM), the analyses resulted of Kota Kinabalu area suggests that 2.78% of the area can be categorised as Very Low Hazard, 14.14% as Low Hazard, 19.74% as Moderate Hazard, 51.63% as High Hazard, 11.34% as Very High Hazard and 0.37% as Extremely High Hazard. Model accuracy assessment of LHA was performed using consistency ratio (CR) equal to 0.0129 (< 0.1) (acceptable) and 93.50 % accuracy of the validation prediction. Thus, the newly developed method works satisfactory and high reliability; and is applicable to further research development in Kota Kinabalu, Sabah, and potentially to expand with different environmental settings.