

Flood susceptibility assessment (FSA) using gis-based frequency ratio (FR) model in Kota Belud, Sabah, Malaysia

ABSTRACT

The flood is one of the most devastating natural disasters to strike Sabah, Malaysia, especially in the Kota Belud region. The Flood Susceptibility Analysis (FSA) was described using bivariate statistical analysis (the Frequency Ratio model) based on a Geographical Information System (GIS). Field surveys and formal reports from local authorities in the study area created the flood inventory map. The training dataset for statistical analysis consisted of 100 flood locations inundated in 2017, while the validation dataset consisted of 54 flood locations from the 2016 flood report. Eight (8) parameters (elevation, slope curvature, slope angle, topography wetness index, drainage density, drainage proximity, land use, and soil type) were extracted from the database and then converted into a raster format with a cell size of 5m x 5m. Finally, using the natural break classification method, the FSA was generated and classified into five classes: very low, low, moderate, high, and very high susceptibility. The area under the curve (AUC) analysis validated the flood susceptibility model's accuracy. The success rate AUC was calculated to be 0.89, while the prediction rate AUC was 0.82. The flood susceptibility analysis could be used to develop flood mitigation strategies in land use planning.