



Flood Vulnerability Mapping using Frequency Ratio Model and Dempster Shafer Theory: A Case Study on Devikulam and Udumbanchola Taluks of Idukki District, Kerala, India

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Abstract: Each year floods triggered by heavy monsoon rains have displaced millions of people in India, Nepal and Bangladesh in the north and Kerala in south. Vulnerability helps us to find the degree to which the area is susceptible to flooding. In this study flood vulnerability mapping was done for Devikulam and Udumbanchola taluks of Idukki district in Kerala state. The factor taken for this study are land use, drainage density, lineament density, soil, slope, rainfall, geology and geomorphology. Thematic maps of these factors were prepared from satellite images and field data using ARCGIS 10.5. Frequency ratio model and Dempster Shafer Theory were used to map the vulnerability of flood in the taluks of Idukki district. The flood vulnerability map of the region was divided in to low, medium, high and very high vulnerable area by using both the models. The results of the models were validated using the past flood occurred locations. 24.92% of the study area falls under very high flood susceptibility region and 25.75% of the area falls under high flood susceptibility region. Frequency ratio provided 75% prediction accuracy and Dempster Shafer Theory showed higher prediction accuracy (80%). These results obtained can be used for the planning and management of the areas vulnerable to floods and prevent flood-induced damage.

Keywords: Rainfall, Slope, Soil, Flood, Remote sensing and GIS
