A fuzzy multi-criteria decision tree model for flood hazard assessment in the Dhemaji district of the state of Assam in India

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Flood in the North-Eastern part of India is a chronic event occurring from the River Brahmaputra and its tributaries and causes immense loss to the human life and property. Particularly, during the monsoon period, the north bank tributaries cause havoc on the nearby regions especially in the Dhemaji District. These tributaries mainly originate from the glacier fed regions and inundate the different locations of the Dhemaji district. In this work a fuzzy multi-criteria decision analysis model is developed to prepare the flood hazard map of the Dhemaji district. Six different layers are considered in the analysis such as elevation profile, Flood occurrence period, River confluence points of the second order tributaries, historical embankment breach locations, normalized difference vegetation index and normalized difference moisture index. The outputs from the model are categorized into very low to high hazard zone. The consistency ratio calculated from the assigned weights is found as 0.092. The computed flood hazard map from the present model is compared with the observed flood occurrence events and found to be realistic and satisfactory.

Keywords: Fuzzy AHP, Multi criteria decision analysis, Flood occurrence, Embankment breach, River confluence points