Flood Vulnerability Mapping of Ogbaru Local Government Area, Anambra State, Nigeria

Ogochukwu Uju Izuegbu and Usman.S Lay (Nigeria)

SUMMARY

Globally, flooding has become inevitable occurrence increasing rapidly in different parts of the world, including Nigeria. It is a common natural disaster in Nigeria that destroys quantum of lives and infrastructures. This study is basically on flood vulnerability mapping of Ogbaru LGA, Anambra State, Nigeria, to determine highly vulnerable, moderately vulnerable, vulnerable and less vulnerable area to flood. SRTM DEM 30m was used to generate the flood conditioning parameters; Slope, Distance to River, Flow Direction, Flow Accumulation, Basin, Watershed, Drainage Density, Sentinel II image of 10m resolution was used to derive Land Use Land Cover of the area using maximum likelihood algorithm in supervised classification. Other parameters such as soil and rainfall were also derived. Multi Criteria Analysis (MCA) method using Analytic Hierarchy Process (AHP) was employed where ten criteria including: Slope, Flow Direction, Flow Accumulation, Basin, Watershed, Drainage Density, Distance to River, Land use/cover, Rainfall and Soil were assigned weights according to their order of importance from the most to least desirable criteria. Subsequently the criteria were reclassified into five classes with the reclassify algorithm using ArcMap 10.8.2 software, weighted overlay model was used to generate flood susceptibility map of Ogbaru LGA. The Multi Criteria Analysis (MCA) revealed that the Mean Annual Rainfall (MAR) which was 28% contributed more to flooding than other factors considered in the model followed by distance to river (20%), slope (15%), soil (9%) and basin (6%). The percentage of areas vulnerable to flood shows Highly Vulnerable (2%), Vulnerable (39%), Moderately Vulnerable (55%), Less Vulnerable (4%). Accuracy assessment of the supervised image classification was performed using the confusion matrix algorithm. The flood inventory maps of 2018, 2020 and 2020 from Nigeria Hydrological Services Agency (NIHSA) was used to validate the accuracy of the flood vulnerability map. High accuracy of the AHP model and weighted overlay model serves as a viable approach in the prediction and mitigation of flood. This study called for strategic prediction, monitoring, mitigation and prevention of flood.

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