



MULTI CRITERIA ANALYSIS FOR ASSESSMENT OF VULNERABLE AREAS TO FLOOD HAZARD IN THE UPPER RIVER KADUNA BASIN, NORTH-CENTRAL NIGERIA

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ABSTRACT

The study was conducted on multi criteria analysis for assessment of vulnerable areas to flood hazard in the upper river Kaduna basin, north-central Nigeria. Six (6) criteria; topography, slope, landuse and landcover, stream density, soil types and mean annual rainfall of the area were integrated for assessment of vulnerability of flood hazards in the basin. Data on each of the six (6) factors were acquired, processed, weighted (using Analytical Hierarchy Process (AHP)) and overlain using weighted sum module of ArcGIS 10.5 software. The output map was classified into four (4) classes of vulnerability, that is, highly vulnerable, vulnerable, marginally vulnerable, and safe zones. The result revealed that parts of Bauchi, Kano, Katsina and Plateau States that were within the basin were not much vulnerable to flood hazards. However, close to half of the land area (48.43%) in Kaduna State were found to fall in either highly vulnerable or vulnerable zones, while 88.9% of the land area of Niger State within the Basin was also either highly vulnerable or vulnerable. Kaduna metropolis (comprising of the entire Kaduna North and South LGAs as well as parts of Igabi and Chikun LGAs), which is the most populated town within the entire basin was found to be more vulnerable to floods than any of the other LGAs in the State. In Kaduna South, 86.87% were highly vulnerable, almost half (44.88) of the land area of Kaduna North were also highly vulnerable. It was concluded that rainfall, topography urbanization and land-use were the main factors responsible for flood hazards. Proper land-use management and monitoring as well as sustainable utilization of the entire River Kaduna basin were recommended to minimize the constant occurrence and effects of floods in the area.

Keywords: Analytical Hierarchical Process, Flood Hazards, Flood Vulnerability, Geospatial Techniques, Kaduna Basin, Multi-Criteria Analysis.