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Physical Flood Vulnerability Mapping using the Analytical Hierarchy Process Method and Geography Information System: Application to the Savannah Region, Togo (West Africa)

Komi Kossi

Research Associate, WASCAL, University of Lomé

E-mail: *kossik81@yahoo.fr*

Flood is a natural hazard which causes economic damages and loss of lives in West Africa. Flood hazard mapping is an important component for efficient flood risk management. The aim of this study is to assess physical vulnerability to flood at the regional scale in Togo. The methodology used in this research is based on the integration of remote sensing data including rainfall, elevation, drainage density, soil (infiltration), land cover/use and slope within a Geography Information System. The relative weight of each parameter for the flood hazard is computed using an "Analytical Hierarchy Process" (AHP). The results show that areas with high physical vulnerability to flood covers 33.33% of the study area and are mainly located in communes along the Oti River namely Mandouri, Borgou, Tambigou, Tchanaga, Tchamonga, Mogou, Galangashi, Mango, Sadori, Sagbiebou, Fare and Koumongou. The consistency index of the AHP method is 0.02. The comparison of the physical flood vulnerability map with the flood event of September 2007 shows that the proposed map is valid and can be used to identify areas vulnerable to flood, to promote greater awareness about the risk of flood and to prioritize the flood mitigation efforts in the country.