Multi-Factor GIS-Based Flood Susceptibility Mapping in the Congo River Basin: Ndjili Basin case study (Poster)

Ikuzwe Hakizuwera[1], Matete Egbolo Keren[2], Salomon Salumu Zahera[1,2]*

[1]Institut National du Bâtiment et des Travaux Publics, Kinshasa, D.R. Congo
[2]Laboratoire de Modélisation des Hydrosystèmes et des Constructions Hydrauliques, Kinshasa, D.R. Congo
**Corresponding author: salomon.salumu@polymtl.ca*

ABSTRACT

Flooding poses significant risks to urban resilience and human security in the Congo River Basin. In particular, Kinshasa region, encompassing the cities of Kinshasa, experiences recurrent flood events that threaten densely populated and poorly serviced areas. Despite its socio-environmental vulnerability, the region remains understudied in terms of flood hazard mapping and predictive spatial modelling. This study presents a GIS-based multi-criteria approach to assess flood susceptibility in the Ndjili Basin area using a combination of topographic, climatic, hydrological, and anthropogenic factors. Key datasets include ALOS PALSAR-derived Digital Elevation Model, CHIRPS precipitation data, soil texture maps (ISRIC), and OpenStreetMap-derived road and drainage networks. Each variable will be reclassified into hazard levels and integrated using weighted overlay techniques. Six scenarios will be computed by varying factor weights to evaluate their influence on flood risk distribution. Validation will be performed through a comparison with known flood-prone locations in Kinshasa. The preliminaries results analysis reveals that soil texture and topographic wetness index (TWI) are critical drivers of flood susceptibility near drainage zones, while precipitation intensifies risk in elevated urban zones with low infiltration capacity. This research contributes a replicable methodology for urban flood risk mapping in tropical river basins. The outputs can support spatial planning, early warning systems, and adaptive infrastructure investments in flood-vulnerable in the Congo River Basin region.

Keywords: Flood Hazard Assessment, Hydro-Spatial Modelling, Remote Sensing, Urban Flood Risk.