

Flood Risk Assessment in the Niger River Basin in Support of the Conception of a Flood Risk Management Plan: Case Study of the District of Malanville, Benin

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Abstract : A study was carried out to evaluate the flood risk in the district of Malanville located along the Niger River. The knowledge produce by this study is useful in the implementation of adaptation and/or mitigation measures to alleviate the impact of the flooding on the populations, the economy and the environment. Over the course of the study, the lack of data in the area of interest has been one of the main challenges encountered. Therefore, in the analysis of the flood hazard different sources of remotely sensed data were used. Moreover, the flood hazard was analysed by applying a 1D hydraulic model: HEC-RAS. After setting up the model for the study area, the different flood scenarios considered were simulated and mapped using ArcGIS and the HEC-GEORAS extension. The result of the simulation gave information about the inundated areas and the water depths at each location. From the analysis of the flood hazard, it was found that between 47% and 50% of the total area of the district of Malanville would be flooded in the different flood scenarios considered, and the water depth varies between 1 and 7 m. The townships of Malanville most at risk of flooding are Momkassa and Galiel, located in a high-risk and very high-risk zone, respectively. Furthermore, the assessment of the flood risk showed that the most vulnerable sector to the inundations is the agricultural sector. Indeed, the cultivated floodplains were the most affected areas by the floodwater in every flood scenarios. Knowing that a high proportion of the population of the district relies on their farmlands in these floodplains for their livelihood, the floods pose a challenge not only to the food security in the area but also to its development.

Keywords : flood risk management, Niger, remote sensing, vulnerability

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