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Application of Remote Sensing and Geographic Information System for Assessment of Flood Risk on the Major Downstream Areas of Gombe Metropolis, Nigeria

Idris S.[1*] and Dharmasiri L.M.[2]

[1]Department of Geography, Federal University Kashere, Gombe State, Nigeria
[2]Central Environmental Authority (CEA), Sri Lanka
**idris.saidu@yahoo.com*

Abstract

The world's population is rapidly becoming more urbanized as the world seen a swift urban population increase. Gombe Metropolis is among the urban areas of Nigeria affected by the consequence of frequent seasonal floods leading to an unpropitious effect on the metropolitan communities. These urbanization dynamics has caused a rapid urban growth through the transformation of many different land uses into the built-up environment. As a result, flood risk in the metropolis has been rising in recent years and efforts by the people and government to mitigate the flood risk have not been fully successful. Thus, this paper attempts to examine the nature of flood risk on the major downstream areas of Gombe metropolis. Fundamentally, this study applied Geographic Information System and Remote Sensing as a tool for integration of spatiotemporal data for modeling and comparison of urban development scenarios and its consequential effect in creating flood risk on the downstream areas of Gombe Metropolis. Thus, GIS and Remote Sensing have been applied to detect land use/land cover changes, by looking at the trend in Land use/Land Cover Change from 2003 to 2014 in the Gombe Metropolis. Accordingly, the study identified Land use/Land cover types in different residential areas of the metropolis with more emphasis on the building density in each area. Finally, Gombe Metropolis Flood Risk Zones were detected and developed into Gombe Metropolis Flood Risk Map. The paper was able to reveal a significant growth of built-up environment and the occupation of floodplains in the downstream areas as the main factors for flood risk in Gombe Metropolis. However, the flood risk index established that the residential areas found on the very high to high flood risk zones include Barunde, Government Residential Areas/Gabuka, Pantami, Dawaki, and Tudun Wada. It was further revealed that the residential areas in the moderate flood risk zone are, Jankai, Jekadafari, Herwagana, Bolari/Madaki and MUAK.

***Keywords*:** Geographic Information System, Flood risk, Gombe Metropolis, Remote sensing