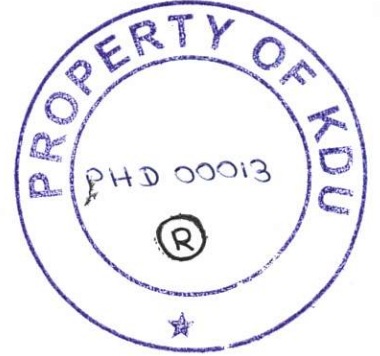


**DETERMINATION OF HYDROGIS MODEL
DEVELOPMENT FRAMEWORK FOR URBAN FLOOD
MANAGEMENT BY RECOGNIZING STAKEHOLDER
CATEGORIES**



by

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ABSTRACT

Determination of HydroGIS Model Development Framework for Urban Flood Management by Recognizing Stakeholder Categories

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Decision-makers and policymakers engaged in flood management rely on sophisticated GIS-enabled hydrological tools known as HydroGIS models for informed decision-making. However, the growing flood risks and damages prompt questions about whether the HydroGIS tools themselves are problematic or if the decision-makers/policy-makers choices are deficient. Hence it is necessary to first evaluate urban flood management HydroGIS models and development frameworks and then review the decision-making process for a sustainable solution. Though there are separate guidelines and frameworks for hydrologic and GIS model development, there is a lack of a framework for HydroGIS models. For the identification of a framework, it is necessary to first develop a HydroGIS model and then based on the experience and available research work perform the development of the framework. In the present work, the tool called GIS2MUSCLE, initially developed by the Author in 2012, was re-evaluated, revealing five different issues addressed through a peer-reviewed article with suggested solutions. Stakeholder needs for the tool were investigated through three user surveys involving 206, 58, and 48 participants. The study identified the need of a detailed evaluation of stakeholders and their incorporation in the modelling framework for HydroGIS model development. Hence the present research identified its objective as the identification of stakeholder components and their integration to develop a HydroGIS model development framework.

The study conducted a comprehensive analysis to identify main stakeholders, employing Use Case Analysis, Process and Data Integration Model Analysis, Thematic Research Case Review and Expert Review while incorporating conceptualisation and verification in four main phases. Stakeholder categories were conceptualized and rationalized after analysing the existing stakeholders and practical implementation requirements. 32 research cases within the same domain were selected to investigate integration depths, utilizing Multi-Attribute Utility Theory (MAUT) and Weighted Average Programming (WAP). The identified components and integration depths were subjected to verification using 71 experts incorporating Multi-Criteria Group Decision Making (MCGDM) and Thematic Analysis methods.