

Flood Hazard Assessment in the Hindon River through a Coupled Hydrologic and Hydrodynamic Model

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Snowballing population and anthropogenic influences, and ensuing chaotic development and climate uncertainty, have posed unprecedented challenges for the flood management. The flood risks have worsened because of unplanned urbanization, and consequent flood plain violations. This necessitates a holistic study to examine and weigh any proposed or existing development in the flood plain and its proximity.

The present study is focused on the scientific demarcation of the flood plain zones for a range of anticipated flood risks in the Hindon River of Northern India. In this study, a 2-D hydrodynamic model, International River Interface Cooperative (iRIC), has been coupled with Soil and Water Assessment Tool (SWAT) hydrological model in a geospatial environment, to simulate the hazards from the floods of different return periods. With minimal data, resource and time requirement, the developed model has been efficacious in capturing the flood dynamics and is able to reasonably predict the magnitude, extent and time of occurrence of the flood. With heightened flood risks in densely populated nations like India, economic yet integrated approach such as this, can facilitate policy makers in methodical flood plain development for effective mitigation of the future floods.

Keywords: Floodplain Development, Flood Risk, International River Interface Cooperative (iRIC), Soil and Water Assessment Tool (SWAT), Geographic information System (GIS)