

# Flood Risk Mapping Using Geospatial Techniques And Hydraulic Model

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background, purpose, focus, methods, results and conclusions

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**Abstract:** Floods are the most devastating and destructive natural disaster. They occur at many places of the world, resulting in widespread damage and death. The annual global flood damage is estimated at US \$13 billion and about 6000 deaths for an average of last 30 years. Malaysia also has similar problem with estimated annual flood damage about RM 900 million. It is very essential to adopt any means or tools to reduce or prevent flood damage. Flood maps are one of the vital tools to provide valuable information for reducing flood damage and spatial planning purpose. Various types of flood maps have been produced to address these three main aspects: hazards, vulnerabilities, and risks in a particular area. Among the flood maps, development of flood risk map is gaining increasing attention at many countries as this map shows the potential adverse consequences of a flood event. There is lack of flood risk map development in Malaysia. The initiative of this study is to develop a new framework to produce a local based flood risk map. This risk map also consideration of monetary losses to physical elements at risks. Kota Tinggi located at Johor state in Malaysia was selected as study area as this city experienced a severe flood event in 2006/2007. Methodology of this study included four phases. The first phase was data collection, which data are LiDAR DEM, Landsat TM 5, hydrological data, river network and cross section data, real estate data and cadastral data. Second phase was pre-processing which included geometric correction and radiometric correction for Landsat TM 5 and LiDAR DEM data rescaled. Third phase was model calibration and simulation of different magnitudes flood events. Last phase was focused on flood risk assessment. In this phase, three different stage-damage functions were adopted in estimating the flood damage of three different physical elements at risks (commercial, residential and industrial area). The average flood damage for residential areas are RM 350/m<sup>2</sup>, RM 200/m<sup>2</sup> and RM 100/m<sup>2</sup> produced using United States, The Netherlands and Malaysia damage functions. A local scale of flood risk map in terms of qualitative and quantitative is successfully produced. Due to lack of local based damage function used for validation the adopted stage damage function. Further study should carry out especially in developing a local scale damage function.

Keyword: Flood risk, remote sensing, geography information system, flood damage, stage damage function