



River Flood Hazard Modeling: Forecasting Flood Hazard for Disaster Risk Reduction Planning

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Abstract

The objective of the study is to create a flood hazard model of Tarlac River and to calibrate the model based on data gathered from the Philippine Atmospheric Geophysical and Astronomical Services Administration. The study employed analytical method wherein the 1D flood modeling was utilized. GIS, DEM data, rainfall data, river analysis system, HEC-GeoRAS, hydrologic modeling system, and HEC-GeoHMS were utilized. The different flood models revealed that Tarlac River is not expected to be overtopped by flood water as regards the different extreme rainfall events considered in the present study. The RAS model simulation was based on the concept that there is no base flow observed within the river reach before the occurrence of any extreme rainfall event. Henceforth, there is still no 100 percent assurance that the river reach will not be overtopped with the occurrence of initial base flow in combination with the occurrence of higher extreme rainfall events. Further studies or investigations should be delved into such combination of events. Possible levee breach of the Tarlac River as well as the possible incorporation of flood mitigating interventions in future modeling scenarios can be likewise considered.

Keywords: Flood Hazard Modeling; Flood Modeling; River Analysis.

1. Introduction

With the advent of global warming and higher recorded rainfall events, urban flooding as well as levee breach along waterways is experienced widespread among different countries. This causes significant damage to property, disruption of economic activity, and may result to loss of life. Flood modeling nowadays are commonly used to forecast probable flood events or scenarios based on different computed extreme rainfall data. The result of the flood models can serve as basis for policy makers to enhance the flood hazard preparedness of the community as well as to incorporate flood mitigating strategies in short term and/or long term project plans. In terms of preparedness, the communities which are vulnerable or which may encounter flood hazard should be made aware of risks they may be exposed to [1]. In this regard, it can be deduced that preparedness is the key to minimizing the harmful effect of flooding to the community.

Flood management or control is a public good and it can help bring riparian to negotiate around benefits versus allocating flows [2]. There are so many things which limit the management options as regards funding for flood hazard management, space or land utilization, and respect to cultural heritage [3]. These are the concerns that need to be addressed by the local government units in general.

Tarlac River is the primary waterway which passes through the City of Tarlac. The water flowing along the river originates from the mountain range along the boundary of the Provinces of Tarlac and Zambales. Tarlac River passes

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