
FACULTY OF ENGINEERING

**DEPARTMENT OF AGRICULTURAL MECHANIZATION AND
IRRIGATION ENGINEERING**

FLOOD RISK ASSESSMENT IN NAMISINDWA DISTRICT USING GIS

BY

MBEIZA DELORENCE

BU/UP/2017/1683

SUPERVISOR: MR. OKETCHO YORONIMO

*Final year project report submitted to the department of Agricultural mechanization and
irrigation engineering in partial fulfillment for the award of Bachelor of Science in
Agricultural mechanization and Irrigation engineering*

ABSTRACT

Throughout the human history floods have been an integral part of the civilization. Still men have not quite coped well to live with floods. Flooding is the most frequent global natural disaster; rural areas are becoming more vulnerable to flooding due to effect of climate change. Flash flood is one of the most prominent phenomena caused by heavy rains. In developing countries drainage channels is the most common strategy employed for flood control. The failure of preventive measures has led to most authors and researchers to advocate a shift in thinking from preventive measures to flood risk and structural management measures. Recently, the advancement in computer-aided technology has been extensively used in formulating models used for flood calculation and hazard analysis. This study focuses on using a hydraulic model HEC-HMS and HEC-RAS in a GIS environment for the affected areas of Namisindwa, generates the inundation area and the return period for the specified flood events. The research involved studying various literature and collecting ancillary data in form of journals and reports. This helped to formulate the methodology for the whole project.

Hydrological modeling was performed using HEC HMS software, after delineating the catchment basin model using HEC GeoHMS in ArcGIS environment, populating the meteorological model with design storm data and defining control specifications. The 2, 5, 10, 20, 50- and 100-year design storms data input into the model generated design floods of 33.8m³/s, 52.0m³/s, 66.2m³/s, 80.6m³/s, 99.9m³/s and 114.9m³/s magnitudes respectively. Hydraulic modelling was performed using HEC RAS software. The model output channel flood depths at the gauging station were 1.29m, 1.53m, 1.68m, 1.81m, 1.98m and 2.09m for stimulated 2, 5, 10, 20, 50 and 100year design floods respectively. Flood hazard maps were generated by exporting the HEC RAS model output results to Arc GIS where they were processed to identify the flood prone areas. From the flood hazard maps, the most flood prone areas were around the river middle reach.

DECLARATION

I **MBEIZA DELORENCE, BU/UP/2017/1683** declare that all the materials portrayed in this project proposal report is original and has never been submitted for the award of any degree, certificate or diploma to any university or institution of higher learning.

Signature

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Date

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APPROVAL

This project proposal has been submitted with the approval of my supervisor.

SUPERVISOR: Mr. Oketcho Yoronimo

SIGNATURE

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Date

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DEDICATION

I would like to dedicate this report to my beloved family especially my mom and dad with their confidence in me to overcome the entire obstacle in my journey to success. After all, we all have dreams, but in order to make dreams come into reality, it takes an awful lot of determination, dedication, self-discipline and effort.

ACKNOWLEDGEMENT

I have taken efforts in this project. However, it would not have been possible without the kind support and help of many individuals and organizations (DRWM). I would like to extend sincere thanks to all of them.

I am highly indebted to Mr. Oketcho Yoronimo and Mr. Wokoto Steven for their guidance and constant supervision as well as for providing necessary information regarding the project & also for their support in completing the project.

I would like to express the gratitude towards my parents for their kind co-operation and encouragement which helped me in completion of this project.

Great thanks and appreciations also go to my colleagues (Musana Emmanuel, Kissa Derrick, and Tendo Hope among others), in developing the project and people who have willingly helped me out with their abilities.

Without these wonderful, inspiring, and charismatic people, I would not be who I am today, nor would I have accomplished as much as I have through the years. Their unwavering support, encouragement, zest for life, and humor are greatly appreciated.

LIST OF ACRONYOMS

GIS	Geographical Information System
HEC-RAS	Hydrological Engineering Centre-River Analysis System
HMS	Hydrological Modelling System
DWRM	Directorate of Water Resources Management MWE
Ministry of Water and Environment	DEM Digital Elevation Model
UNMA	Uganda National Meteorological Authority
USGS	US Geological Survey
TIN	Triangular Irregular Network

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