FACULTY OF ENGINEERING

DEPARTMENT OF WATER RESOURCES

FINAL YEAR PROJECT REPORT

ASSESSMENT OF FLOOD VULNERABILITY OF ROAD INFRANSTRUCTURE

CASE STUDY: MBALE CITY

BY

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A final year project report presented to the Department of Water Resources Engineering as a partial fulfillment of the requirements for the award of a Bachelor of Science degree in Water Resources Engineering.

ACKNOWLEDGENENT

I would want to begin by expressing that this endeavor was not completed through my own efforts but rather through the unchanging grace of God, for whom I am grateful.

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ABSTRACT

Although the world has recently seen many disasters, flood impacts have garnered the most interest and attention due to their detrimental repercussions. Asia accounts for more than half of the world's flood losses and damages, which cause fatalities, infrastructure destruction, and public panic. The primary objective of the flood vulnerability assessment is to give people more knowledge about how to deal with flood dangers. In this case, vulnerability is the key idea in the study and evaluation of floods. Many scholars have specified different approaches and methods to comprehend vulnerability assessment and how geographic information systems estimate the susceptibility of flooding as well as the danger associated with it. Geographic information systems track, predict, and mitigate the effects of disasters. This study carefully evaluates the methods used to estimate floods and their dangers by integrating a geographic information system. We looked at papers on flood vulnerability from 2010 to 2020. Through the systematic review methodology of five research engines, the researchers were able to identify a gap in flood vulnerability assessment tools and methods that can be remedied by fusing high-resolution data with a multidimensional vulnerability methodology. The study reviewed a number of risk variables and focused on the weaknesses in key categories of flood susceptibility. According to the research, the indicator-based approach offers a better understanding of vulnerability assessment. To decrease the flood catastrophe, the geographic information system provides a suitable environment for precise analysis and mapping.

DECLARATION

I, MAFUMBO DERICK, hereby attest that the aforementioned report is wholly unique and has never before been presented to a university or other higher education facility with the intention of being considered for any academic honors. I am solely responsible for the information in this report.

NAME: MAFUMBO DERICK

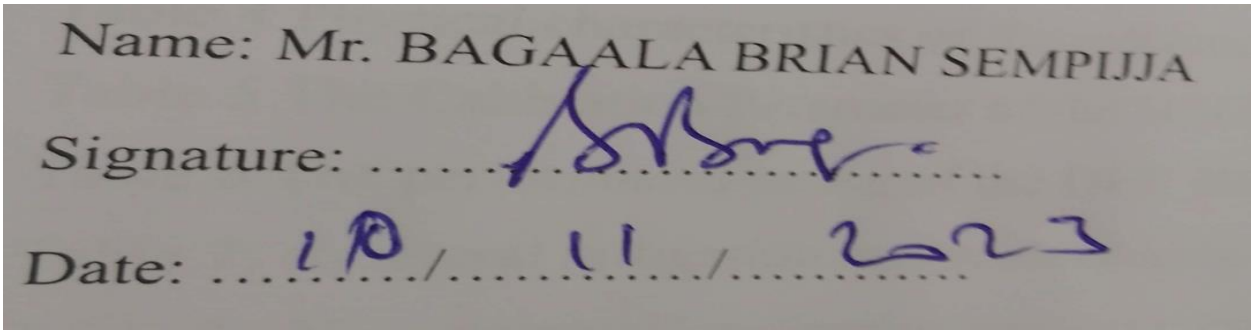
REG:NO: BU/UP/2019/3050

SIGN: ……

DATE: ……

APPROVAL

This is to certify that I received guidance from my supervisor while drafting this final year project report on the topic "evaluation of flood vulnerability of road infrastructure in mbale city." Mr. BAGAALA BRIAN SEMPIJJA is his name.



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1 CHAPTER ONE

1.1 INTRODUCTION

The project's history, problem statement, objectives, justification, and study's scope are all covered in this chapter.

1.2 BACKGROUND

This study evaluates flood vulnerability and adaptability, including flood vulnerability causes, degrees of flood vulnerability, and community coping mechanisms. Floods are caused by excessive runoff or a rise in water levels in a specific area that exceeds the capacity of the environment(Len et al., 2018). One of the most frequent and widely dispersed natural threats to life and property is flooding. The worst aspect is that rainfall is one of the main contributors to floods and that it cannot be avoided because it occurs naturally(Len et al., 2018) (Liu et al., 2020).

Dams and dikes are structural solutions that can help mitigate and avoid flood damage, while early warning systems and education are nonstructural methods. Floods are happening more frequently in many communities throughout the world. The increases have resulted in environmental degradation and the death of people(Liu et al., 2020). A catastrophic event is predicted to result from flood damage due to changes in global warming. These changes will make it more likely that there will be droughts and floods, two extreme weather events. Forecasts from the Intergovernmental Panel on Climate Change indicate that one of the largest hazards to the human race worldwide is flooding(Nguyen et al., 2021)(Office et al., n.d.). To adapt, prevent, respond to, and lessen the effects of flooding on the socio-economic and physical environment, serious attention is required.

The population at risk has been increasing annually, and the majority of them live in developing countries with high levels of poverty, making them more susceptible to natural disasters. This is due to poor mitigation, adaptation, and response to flood threats in developing nations as a result of resource scarcity(Meißl et al., 2020). This does not, however, imply that developed areas are immune to flood danger or vulnerability. Vulnerability and adaptation should not be generalized because they depend on circumstance. The outcome can be ambiguous if these two aspects of flood vulnerability are generalized. Communities and individuals are exposed differently(Nasiri et al., 2016). Due to socioeconomic characteristics like wealth, education, race, ethnicity,

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