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**FACULTY OF ENGINEERING  
DEPARTMENT OF MINING AND WATER RESOURCES ENGINEERING.  
WATER RESOURCES ENGINEERING PROGRAMME.**

**FINAL YEAR PROJECT.  
DESIGN OF A FLOOD CONTROL RESERVOIR  
CASE STUDY: AWOJA RIVER, SOROTI**

**BY: ANGEYANGO CONSLATE.**

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**MAY, 2017.**



## **ABSTRACT**

Floods are becoming a more pronounced disaster in many parts of the country costing lives and also damaging property. One observation is that information on floods appears not to be well documented and actually no institution seems to be in charge of these particular disasters. (Mary, 2013)

Due to the varying climatic conditions, floods and drought seasons, considerations have to be made for storage of the excess flood water to cater for the drought periods in Soroti region.

The research detailed in this thesis not only shows an approach for design of a flood control reservoir, but also provides an analysis of the ascertainment of flood frequency in the Awoja catchment. This thesis is divided into five chapters. Following the introduction which is chapter 1, a comprehensive literature review was performed, which resides in Chapter 2. The third chapter contains background information on GIS and GIS tools, as well as information on the data files that were used in the research. Chapter 4 provides a brief explanation of the methods used to calculate the required parameters from the acquired data sets, Chapters 5 contains the detailed methodology used, and 6 presents the conclusion, recommendations made in line with the project and also helpful for further research in this area.

Although weather forecasting and telecommunications have reduced human losses from floods the amount of flood damage continues to increase worldwide. The purpose of flood control is to reduce by 20 or 50 percent the peak flow value of these high floods

The hydrologic phase is more elusive than the physical phases that include the dam, spillway, and reservoir. Nonetheless, good engineering design in the hydrologic phase as well as in the other phases produces benefits of favorable construction, maintenance, and operation costs for the project. This study was undertaken to fulfill the need for improved methods of analysis and design of a reservoir for flood control. The knowledge of the hydrological behavior of a river is valuable information useful for many purposes: from the regulation of water resources used for the management of extreme events, design of hydraulic structures and for many environmental issues/ conservation.

**DISCLAIMER**

I CONSLATE ANGEYANGO, hereby declare to the best of my knowledge, that this project report is an outcome of my original work and that it has not been presented to any institution of learning for an academic award.

Signature..... Conslate .....

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**APPROVAL**

This final research report has been submitted to the Faculty of Engineering for examination with approval of my supervisors,

Ms.Nakabuye Hope Njuki .....

Mr.Mugisha Moses. ....

## **DEDICATION**

This report is dedicated to my beloved parents Mrs.Hellen Apilla and Mr. Unega Kamillo in appreciation for their selfless care and unflinching support provided to me since childhood, and for the spirit of hard work, courage and determination instilled into me, which attributes I have cherished with firmness and which have indeed made me what I am today.

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## LIST OF ACRONYMS

MWE Ministry of Water and Environment

DWRRD Directorate of Water Resources Regulation Department.

HEC-HMS Hydrological Engineers Centre- Hydrological Modelling Systems.

DEM Digital Elevation Model.

## CHAPTER ONE

### INTRODUCTION.

#### *1.1 Preamble*

This chapter will discuss the importance of reservoirs, total area in Uganda with flood control reservoirs, brief climatic conditions of Awoja catchment, economic activities carried out and problems faced by farmers, objectives of the research and the scope of the study.

#### 1.1 BACKGROUND.

Flooding is a natural phenomenon occurring globally all year round. Africa has long suffered from natural disasters, one of the most devastating being flooding. Eastern Africa in particular is blighted by floods on a regular basis. Wide areas of Malawi are still recovering after the major floods that hit the country in January 2015, Kenya, Tanzania and Mozambique have all suffered flooding in the first few weeks of 2016. Flooding damages the region's infrastructure as well as taking lives and shattering communities. Rebuilding processes and resources are often damaged by the flooding itself (Kherraz, 2016).

In Uganda the flooding problem has only been getting worse. About 52 floods have occurred since 1990 with devastating impacts on infrastructure, crops death and displacement of people.

The Awoja catchment is located in the Kyoga basin in the Eastern part of Uganda. It covers an area of 11,000km<sup>2</sup> it's mountainous to the East and drains into the lake region in the west. Awoja catchment consists of 14 districts which are wholly or partly positioned within the catchment. (Kherraz, 2016)

The Awoja catchment is one of the areas in Uganda that has been the most affected by impacts of climate variability and change. Floods and landslides are the result of these climatic variations. It's vulnerable to landslides in the mountainous region and floods in the lowland. The areas in Awoja most affected by floods include: Sironko, Bulambuli, Kapchorwa, Kumi, Serere and Soroti. (Kherraz, 2016)

Floods following heavy rains in 1997/1998 killed 53 people and displaced over 2000 people. Roads bridges, houses crops and property worth US\$ 20 million were also destroyed. There is need therefore to come up with sophisticated means to help control flooding by design of reservoirs. (Kherraz, 2016)

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