



**BUSITEMA
UNIVERSITY**
Pursuing Excellence

**DEPARTMENT OF MINING AND WATER RESOURCES ENGINEERING
WATER RESOURCES ENGINEERING PROGRAMME
FINAL YEAR PROJECT REPORT**

**DESIGN OF AN ON-FARM DETENTION RESERVOIR FOR
IRRIGATION
AWACH SUB COUNTY, GULU**

**LAKOT NANCY
BU/UP/2013/1114**



SUPERVISOR(S)

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

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ABSTRACT

This project report was aimed at designing a detention reservoir for irrigation in Awach Gulu district in order to collect the run off during heavy pours which can be used for irrigation during dry seasons.

In Awach sub county there is intensive rain during rainy season which when harvested can be used during dry season. The objective was to delineate the catchment area of the area, estimate the hydrological budget of the area and to design the reservoir. Acholi Sub-Region is among the worst affected areas by the prolonged civil fighting and drought. The longest violence in this region has been with the Karamojong who have conducted cattle raids.

In this study, the Soil and Water Assessment Tool (SWAT) under Geographical Information System (GIS) was applied to simulate the daily surface runoff. The daily rainfall data, maximum and minimum temperature, sunshine, humidity, and wind speed of stations for the period 1996 to 2016 were considered in this study. The data were used to estimate the daily runoff volume. The Soil and Water Assessment Tool (SWAT) was considered for daily simulation for runoffs. The maximum annual runoff volume for the considered catchment is $9.33 \times 10^8 \text{ m}^3$ 30 days.

This report has detailed thesis with chapter one having the problem statement, background of the of the project study area and objectives, chapter two contains the literature review, chapter three which contains methodology, chapter four has result and discussions and chapter five which has recommendations and conclusion.

Designing of a detention reservoir will help to retain water which can be used for irrigation during both dry and wet seasons thereby sustaining productivity and enhance agriculture. Climate change and the resulting changing rainfall patterns especially floods pose a threat to many farmers from Awach sub county, and the reliable access to water remains a major constraint for the poor farmers in the area. The 2008 World Development Report on "Agriculture for Development" emphasized that in order for agriculture to meet future food demand, productivity improvements need to be achieved in both irrigated and rain fed areas (World Bank, 2007).

DECLARATION

I **Lakot Nancy** hereby declare that, this report is a true work of my own efforts with the help of my supervisors and has never been presented by any person to any institution for an academic award.

SIGNATURE: *Nancy*

DATE: *29th 05.2017*



DEDICATION

I dedicate this report to my beloved parents Mr. and Mrs. Oketch Veronica, my dear husband Mr. Ameny Stephen and daughters Mercilyn and Martha my brothers and sisters whose love, support and sacrifice towards my education has made me achieve my dream of pursuing a degree in Engineering.

APPROVAL

This project report has been submitted to the faculty of Engineering for examination with approval of my supervisors mentioned below;

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ACKNOWLEDGEMENT

I would like to extend my sincere thanks to the almighty GOD who has gifted me with life and has enabled me to reach this academic height as he has been the provider of all the necessary requirements.

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List of acronyms

GIS – Geographical Information System

MWE – Ministry of Water and Environment

UNMA – Uganda National Meteorological Authority

DEM – Digital Elevation Model

USGS – United States Geological Survey

NRSA – National Remote Sensing Agency

NARO – National Agricultural Research Organization

NFA – National Forestry Authority

SSA-Sub Sahara Africa

LRA-Load Resistance Army

IDPs-Internally Displaced People

UN-United Nation

UBOS-Uganda Bureau of Statistics

WDR-World Development Report

IPC-integrated Phase Classification

FAO-food and Agricultural Organization.

RWH-Rain Water Harvesting

ASAL-Arid and Semi-Arid Land

IPCC-Intergovernmental Panel on Climate Change

SCS-Soil Conservation Service

SWAT-Soil and Water Assessment Tool

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CHAPTER ONE: INTRODUCTION

1.0 Overview

This chapter entails relevant information about the project, problem statement, and justification, objectives of the study, purpose of the study and the scope of the study.

1.1 Background

Worldwide, more than 80 percent of the cropped area depends on rainfall alone. Rain-fed agriculture is practiced in almost all hydro climatic zones, and can be highly productive. However, in many dry sub-humid regions, tropical semiarid and arid regions, as well as in some temperate regions, yields tend to be relatively low. With highly variable rainfall, long dry seasons, recurrent droughts and dry spells as well as floods, water tends to be a key constraint for agricultural production systems in these regions. For instance, 96 percent of the cropland is rain-fed, uneven and sparse rainfall often combines with arid conditions, high temperatures, and shallow soils with poor nutrient status to provide extremely uncertain conditions for agriculture and in these conditions farmers tend to adopt low-input strategies with limited yield potential even in good rainfall years (World Bank, 2007).

Most countries in Sub-Saharan Africa (SSA) with Uganda inclusive are experiencing profound socio-economic and political problems the most drastic being food crisis and disruptive conflict (Ngigi, 2003). Presently 13% of the world's population doesn't have access to enough food to live a healthy and productive life yet the ability, technology and resources to produce enough food for everyone

Access to water and water security is important to improve food security in many developing countries. Rainfall is the most important weather parameter in the East African region. This is so because the economies of the countries in the region are mainly dependent on rain fed agriculture (Funk et al, 2008), (Ngetich et al, 2014) (Fox, 2005) (Ongoma, 2013) (For and Rockstrom, 2005). Failure in rainfall in the region results into drought that causes serious socio-economic losses and deaths (Eguru , 2012) (Shisanya et al, 2011).

Agriculture was identified within the (National Development Program) NDP II as one of the priority sectors for investment given its great multiplier effect on the economy.

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