



**BUSITEMA  
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**FACULTY OF ENGINEERING  
DEPARTMENT OF AGRICULTURAL MECHANIZATION AND IRRIGATION  
ENGINEERING.**

**AGRICULTURAL MECHANIZATION AND IRRIGATION ENGINEERING PROGRAMME.  
FINAL YEAR PROJECT REPORT**

**Design and simulation of a drip irrigation system for garlic cultivation in kichwamba sub-  
county Kabarole district.**

MUSHABE ALLAN

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Email: [mushabeallan10@gmail.com](mailto:mushabeallan10@gmail.com); Tel: +256 701 963271



**SUPERVISORS**

MAIN SUPERVISOR: MR: KILAMA GEORGE.

CO- SUPERVISOR: MS: NAKABUYE HOPE NJUKI.

## **ABSTRACT**

This study was carried out in Kichwamba sub county Kabarole district and it was motivated by high levels of poor production and productivity of garlic specifically in Kichwamba Kabarole district. The purpose of this study is to develop an effective and sustainable means of solving the problem of non-uniformly distributed, unreliable rainfall and use rudimentary methods of irrigating garlic by designing a drip irrigation system in which the supply of water for irrigation will be river Mpaga.

The study objectives include; determining the agronomic requirements of garlic, analyzing site relevant climatic data for irrigation system design and management, to study the topographical features of the site, analyze the soil conditions of the proposed site as a basis for designing the irrigation project in line with garlic requirements and to design and simulate the drip irrigation system.

In conclusion, by the end of this project, a sustainable drip irrigation system was designed for one hectare of land and the project once implemented will enhance garlic production and productivity all year round.

## **DEDICATION**

This report book is dedicated to all those who have ever contributed to who, what, where I am today and those who helped me out produce this report book.

## DECLARATION

I Mushabe Allan, hereby declare that this report is an outcome of my own participation and has not been presented for any award in any university, college or any institution of higher learning.

Signature.....Mushabe.....

Date.....27<sup>th</sup> / may / 2016.....



## APPROVAL

This report has been submitted to the department of Agricultural Mechanization and Irrigation Engineering with the approval of the supervisors.

MR. KILAMA GEORGE.

(Main Supervisor)

Date.....

MS: NAKABUYE HOPE NJUKI

(Co-Supervisor)

Date.....

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## LIST OF ACRONYMS

ETc	Crop water requirement
ETo	Reference crop evapotranspiration
GPS	Global Positioning System
PVC	Polyvinyl chloride
USDA	United States Department
SSP	Single Super Phosphate
DAP	Double Ammonium Phosphate
P	Phosphorus
K	Potassium
N	Nitrogen
OM	Organic Matter
NWSC	National Water and Sewerage Corporation
Lps	Liters per second
Lph	Liters per hour
PV	Present value.
PN	Nominal Pressure.
Ha	Hectare
Km	Kilometer
NAADS	National Agricultural Advisory Services
kW	kilowatt
kWhr	kilowatt hour
Rad	Radiation
Min	Minimum
Max	Maximum
No	Number
IR	Irrigation Requirement
Dev	Development.
Temp	Temperature

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## CHAPTER ONE: INTRODUCTION.

### 1.0 INTRODUCTION.

This chapter is about the background to the study, problem statement, justification, objectives and scope of the study.

#### 1.1 Background to the study.

Uganda is located on the East African plateau. The latitude and longitude denominations of Uganda are 1 00 N and 32 00 E respectively. The republic of Uganda covers a total area of 236040 square km. Uganda's latitude and longitude denominations provides it with a climate that is typically tropical(\_www.mapsofworld.com).

According to the Ministry of Agriculture, Animal Industry and Fisheries (CAADP's report 2009), Seventy-five percent of Uganda's geographical area is suitable for cultivation. However, only 30 percent of arable land is presently under cultivation. Nevertheless, agriculture is the source of employment for 70 percent of the people. The productivity, profitability, and continued expansion of the agriculture sector are critical to the well-being of millions of Ugandan house-holds. To achieve this, the government has always advocated for irrigation of high value crops such as garlic from which subsistence farmers can start benefiting financially.

Garlic (*Allium sativum*) locally known as katunguluchumu, has of late gained importance as a spice in many homes also an important spice crop belonging to the family *Alliaceae* along with onion, shallot and chives. They are about 40cm tall when fully grown. The leaves of onion, shallot and chives are cylindrical and hollow while that of garlic are flat and very slender. All the leaves arise from the swollen stem that takes the form of a bulb. According to (Medina *et al.*, 1960), garlic bulb consist of small bulbils, which range from 6-50 commonly called cloves. Garlic plant, the green tops as well as the bulbs are principally used as spice for flavoring and seasoning vegetable and meat dishes, it gives the food a delightful fragrance. It is usually dehydrated for industrial and home use. Its folk medicinal use includes treatment of whooping cough, lung diseases, stomach complaints (as healing of ulcers of the intestines) and disorders resulting from child birth and as a specific for colds, sore eyes and ear-ache; (Kostalova, 1982). Its ability to protect crop against a variety of fungal and bacterial diseases has been scientifically proven by researchers at the University of California in Berkley. Garlic is believed to have originated from central Asia and

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