



**BUSITEMA
UNIVERSITY**
Pursuing Excellence

FACULTY OF ENGINEERING AND TECHNOLOGY

**DEPARTMENT OF AGRICULTURAL MECHANIZATION &
IRRIGATION ENGINEERING**

FINAL YEAR PROJECT

**DESIGN AND FABRICATION OF A SCALED DOWN WHEEL LINE
SPRINKLER IRRIGATION SYSTEM**

Case study: Busitema (Tororo).

BY

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“Submitted as a final report write-up to the Department of Agricultural Mechanization & Irrigation Engineering as a partial fulfilment for the award of a Bachelor’s degree at Busitema University

DECLARATION

I KIPLANGAT DAN of REG N_o. BU/UP/2019/2871, declare to the best of my knowledge that this project report is as result of my own research and efforts.

Signature.....

Date.....

APPROVAL

This project proposal has been submitted to the department of Agricultural mechanization & irrigation Engineering of Busitema University with approval of the following

University Supervisor.

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LIST OF ABBREVIATIONS/ ACRONYMS

FAO	Food and Agriculture Organization
UBOS	Uganda Bureau Of Statistics
GDP	Gross Domestic Product
UN	United Nations
USDA	United States Department of Agriculture
DU	Distribution uniformity
CU	Coefficient of Uniformity
PVC	Polyvinyl Chloride

1. CHAPTER ONE

1.1. BACKGROUND

Uganda being a predominantly an agriculturally based economy, the major source of occupation is agriculture. According to the United Nation's (UN) Food and Agriculture Organization (FAO), Uganda's fertile agricultural land has the potential to feed **200 million people**. 8% of Uganda's land is arable but only 35% is being cultivated. In financial year 2021/22, agriculture accounted for about 24.1% of GDP, and 33% of export earnings (Uganda-Country Commercial Guide agricultural sector, 2022). The Uganda Bureau of Statistics (UBOS,2022) estimates that about 70% of Uganda's working population is employed in agriculture.

Irrigation is a crucial aspect of agriculture, and farmers have been using various methods to irrigate their crops for centuries. One of the most popular and effective methods is the sprinkler irrigation system, which distributes water over the crops using a network of pipes and sprinklers (Peter and Muluneh, 2016)

The wheel line sprinkler irrigation system is a variation of the sprinkler irrigation system, where the sprinklers are mounted on a set of wheels, which move along a fixed path or track. The wheel line sprinkler irrigation system is ideal for large-scale agricultural fields as it is easy to operate, requires less labour, and can cover a larger area(Hill, 2000).

However, the existing and commonly used methods of irrigation in Uganda are Permanent sprinkler systems and (surface irrigation systems) which are not flexible in operation, have many head losses, and consequently result in relatively poor water Distribution uniformity (DU) (Faryabi et al., 2020). Wheel line sprinkler irrigation system is flexible in operation, it also has small head losses compared to the fixed sprinkler systems and it has both high water distribution uniformity and efficiency compared to fixed sprinkler irrigation systems (Faryabi et al., 2020)

Therefore, there is a need to design and fabricate a more efficient and user-friendly wheel line sprinkler irrigation system that can overcome the challenges faced by farmers and help them maximize their crop yields while minimizing water usage.