

BUSITEMA UNIVERSITY
FACULTY OF ENGINEERING
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IRRIGATION ENGINEERING



**AUTOMATION OF A DRIP IRRIGATION SYSTEM FOR CITRUS AT NATIONAL
SEMI ARID RESOURCES RESEARCH INSTITUTE-SERERE**

By

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Design project report submitted in partial fulfillment for the award of
Bachelor of Agricultural Mechanization and Irrigation Engineering of
Busitema University

May 2013

ABSTRACT

While the necessity of irrigation in general is appreciated, the focus of research has now shifted to the recent concept of agric-technology that seeks to widen modern agricultural horizons and in incorporating the use of information technologies and communication (ICT's), shift the focus of irrigation system design toward the new concept of hardware and software synergies for cost reduction, efficiency, design modifications, fertigation and chemigation. In the recent years the emphasis has focused on precision farming, including the use and application of software and more efficient instruments in agriculture besides the use of simulation and modeling of moisture and nutrients movement under different soil and dripper characteristics. Improved micro irrigation systems and in particular an automated system is the focus of this project.

This project undertook to design a system that in the sense of the word 'Automated', would eliminate the use of the Human factor in monitoring. The system employs the use of moisture sensors for measuring and in self triggering irrigation actions, maintain the soil moisture at the desired pre-calculated and preset levels.

This design follows the modern challenge of to improve crop growth and reduce associated costs as a justification for the incorporation of the automated concept in to the irrigation system design. The result is that water use will be significantly reduced, labor cut and continuous monitoring of the moisture guarantee high application precision.

Because the system continuously monitors moisture levels, the system achieves a high level of precision and efficiency of water and chemical use.

The system designed here is simulated to gauge the response and the rate of its effect and operation. The design drawings that summarize the system design are a most satisfying visual cognate of the system, which though simulated, is yet to be implemented. However testing of the system components is crucial to the success of this project and should thus be accomplished in future.

DECLARATION

This project report is my own original documentation and has never before been, partially or fully submitted to any University or institution of higher learning for the award of a Bachelor of Agricultural Mechanization and irrigation Engineering or any other award.

Signature 

Ebitu Larmbert

Date..... 02/08/2013.....



APPROVAL

This project which has been prepared under my supervision has my endorsement for submission

Signature

Ms Abbo Jacqueline

Main supervisor

Signature

Mr. Owaa Sultan

Co-supervisor

ACKNOWLEDGEMENT

The completion of an emphatic project such as this could not have been possible without the participation of learned and resourceful mentors that comprise the lot of the Academic staff of the Department of Agricultural mechanization and irrigation Engineering of Busitema University-the lecturers and technicians, and in particular, my supervisors: Ms Abbo Jacqueline and Mr. Owaa Sultan; individuals with whom I consulted and had valuable technical and moral discussions and to whom I must extend sincere gratitude.

DEDICATION

To my family: thanks for the discipline of your collective love; to my friends especially Max Anders: thanks for watching my back while I took all the chances, and to my colleagues, the class of 2008: thanks for the valuable discussions throughout the struggle years

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ACRONYMS

NARO	:	National Agricultural research organization
NaSARRI	:	National semi-arid resources research institute
FAO	:	Food and Agricultural organization
UBOS	:	Uganda bureau of statistics
JICA	:	Japan international coopération agency
GDP	:	Gross domestic product
UK	:	United Kingdom

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CHAPTER ONE

1.0 INTRODUCTION

This project undertook to solve a significant agricultural problem and had set objectives it strived to. Herein this chapter is an account of the necessary prerequisites to any successful documentation of a design project.

1.1 Background

Considering the current trend of events that have seen a rise in the world hunger levels because of the rapidly increasing populations and the destructive phenomena of global warming manifested in the unpredictability of climate, and which has created an imbalance in terms of production and consumption, there is no longer a question as to the necessity of sustainable Agriculture, and for Uganda, a landlocked country with over 38.5% of its Gross Domestic Product, 85 percent of its export earnings and nearly all the food requirements dependent on Agriculture (UBOS, 2004); the shift toward full-scale irrigated agriculture is inevitable.

Home to the Lake Victoria, the principle source of the White Nile and the second largest fresh water lake in the world, Uganda's rivers and lakes, including wetlands, cover about 18 percent of the total surface area of the country. The total irrigable area in Uganda is approximately 202,000 ha (FAO, 1995). However a recent survey by JICA (2004) revealed that just about 14,000 ha of the irrigable area is under official irrigation and 6,000 ha under unofficial irrigation, particularly for rice irrigation.

The total amount of water used for irrigation is about 12 km³ per year, whereas the annual total renewable water resources are 66 km³. However, even if statistically, these figures imply a high potential for irrigated Agriculture in Uganda, currently, Uganda's Agriculture is mostly rain-fed and is vulnerable to climatic variations. This is bad enough, but most worryingly, regardless of the potential for irrigation, the country's rapid population growth, increased urbanization, industrialization and uncontrolled environmental degradation and pollution are increasing the pressure on the utilization of fresh water resources.

In addition, it is increasingly becoming apparent that the growing need for dependence and a fundamental shift toward irrigated Agriculture coincides with an accelerated competition for

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Note: the plant spacing considered in the design was 6*6 m and the plant density 256 citrus trees.

I will upload you the final copy of the project.