



**BUSITEMA
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FACULTY OF ENGINEERING

**DEPARTMENT OF AGRICULTURAL MECHANIZATION AND
IRRIGATION ENGINEERING**

FINAL YEAR PROJECT REPORT

**DESIGN AND CONSTRUCTION OF A MANUALLY OPERATED
MULTI-CROP WEEDER**

BY

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A final year project proposal submitted to the department of Agricultural Mechanization and Irrigation Engineering as a partial fulfillment of the requirements for the award of a Bachelor's Degree of Agricultural Mechanization and Irrigation Engineering

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EXECUTIVE SUMMARY

The proposed study covers the design and construction of a multi-crop manually operated weeder, testing of the prototype of the machine that will be designed and the economic evaluation of the prototype. This study was aimed at developing a weeder that enables the small holder farmers to improve on their yield productivity and reduce drudgery, crop damage and it's gender sensitive which are associated with the use of hand hoes and animal draft technologies thus enhancing the country's food security status. The crops to be considered in this study include groundnuts, maize and cassava.

Chapter one of this report presents the background to the study which highlights the problem of the study and the importance of solving the problem through the design of a multi-crop manually operated weeder which will reduce on human drudgery, consider gender and reducing on crop damage. Chapter one also presents the objectives and scope of the study as well as the likely benefits of the study to the rural smallholder farmers and the country at large.

An intensive literature review relating to the considered crop varieties, various weeding technologies and an economic evaluation of the existing technologies is provided. The advantages and disadvantages of the existing designs of weeding technologies are also clearly outlined in this chapter.

The methods that will be used to undertake the study are presented in the methodology. The methodology includes the procedures for design of the different components of a multi-crop weeder, construction of the prototype of the designed multi-crop weeder, testing of the prototype and economic evaluation of the prototype so as to ascertain its affordability by the smallholder farmers. The expected outcome of the study is specified in chapter four as a multi-crop weeder for effective removal of weeds from groundnuts, cassava and maize crops.

DECLARATION

I, **KIROKWA LAWRENCE** do hereby declare that this final year project report is the original copy of my personal research under serious supervision. No parts of this report are duplicated unless cited and it has never been submitted in for award of a degree or any other award at Busitema Univesity or any other institution of learning.

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APPROVAL

This project report was compiled and submitted to the department of Agricultural Mechanization and Irrigation Engineering under the supervision as approved below.

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1. Main supervisor:

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2. Co-supervisor:

Mr. Muyingo Emmanuel

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I thank the almighty Lord for His loving kindness and providing me exceedingly abundantly more than I can ever ask or imagine. To Him be the glory power, worship, honor and praise.

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LIST OF ACRONYMS

| | |
|--------------|-------------------------------------------------------|
| CAD | Computer Aided Drawing |
| FAO | Food and Agriculture Organization |
| GDP | Gross Domestic Product |
| HP | Horse Power |
| MAAIF | Ministry of agriculture animal industry and fisheries |
| QPM | Quality Protein Maize |
| UNBS | Uganda National Bureau of Standards |
| USD | United States Dollar |

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CHAPTER ONE: INTRODUCTION

1. INTRODUCTION

This chapter provides an introduction to the proposed study by presenting the problem to be addressed by the study, justification of the study, and objectives and scope of the study.

1.1 BACKGROUND OF THE STUDY

Agriculture is the mainstay of Uganda's economy, and employs the majority of the population (UBOS, 2012). The crops that are commonly grown and consumed in Uganda include: maize, sorghum, millet, cow-peas, groundnuts, cassava, cotton, vegetables, among others. Particularly production, processing and trade in these crops largely contribute an important element in the food industry and the food security situation of the country. Maize, groundnuts and cassava are largely consumed in homes, schools, hospitals, among the armed forces, rehabilitation centers, refugee camps, institutions, and health centers.

Groundnut (*Arachis hypogaea L*) is the second most widely grown legume in Uganda after common beans (Nalyongo and Emeetai-Areke, 1986; Busolo, 1990); groundnut is a very popular crop especially in the eastern and northern regions of Uganda (M Mahmoud et al: 1991). Groundnut - containing 40 - 50% fat, 20 - 50% protein and 10 - 20% carbohydrate depending on the variety - is an ingredient in many Ugandan cultural dishes; it is used as a source of food in its various forms such as vegetable cooking oil, fried groundnut, boiled nuts, groundnut butter, and in bakery products. Additionally, the groundnut plant stalks are fed to cattle or used as mulches in plantations and the groundnut cake which remains after extracting oil from the paste is used as animal feed (Okello et al: 2010). Furthermore, groundnuts add fertility to the soils through their root nodules which fix nitrogen into the soil. Moreover, groundnut is a drought resistant crop that is suitable for dry land farming and this has enhanced its production in areas of low rainfall quantities. Groundnut is grown in the eastern and northern districts of Uganda which include Soroti, Kumi, Mbale, Iganga, Lira, Apac, and Arua. Most farmers grow groundnuts to meet the food requirements and the surplus is sold to earn some income to meet other family needs; small scale farmers grow an average acreage of 1 to 2.5 ha under natural climatic conditions (Busolo, 2001).

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