BUSITEMA UNIVERSITY

Pursuing Excellence

FACULTY OF ENGINEERING

DEPARTMENT OF AGRICULTURAL MECHANISATION AND IRRIGATION ENGINEERING

FINAL YEAR PROJECT

DESIGN AND FABRICATION OF A TWO ROW ANIMAL DRAWN IRISH POTATOE PLANTER

BY

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A final year project report Submitted to the Department of Agricultural Mechanization and Irrigation Engineering as a Partial Fulfillment of An Award of a Bachelor's Degree of Agricultural Mechanization and Irrigation Engineering at Busitema University.

ABSTRACT

Irish potatoes is one of the important food crop grown in the slopes of mount elgon and western parts of Uganda. They are rich sources of carbohydrates, and are grown on fertile soils for greater yield. in Uganda (2011) was approximately 450,000 mt, produced on approximately 65,000 ha with an average yield of 7 mt / ha. The small-scale farmers are capable of growing 1 to 4 acres, under natural Ugandan climatic conditions, and yields of between 80-100 bags per acre.

One of the major challenges for Irish potatoes production in Uganda is, small holder farmers lack an implement which ensures precisions in row planting, saves time and reduces drudgery in planting. The planting of Irish potatoes is labour intensive and time-consuming operation; estimated to take approximately 10 people to plant an acre of land in five hours. Small scale farmers have very positively responded to planting Irish potatoes in rows from traditional methods through opening ridges manually and planting using hand

The main objective is to develop a two row animal drawn planter for Irish potatoes crops that meets farmers' planting requirements and the specific objectives are; to design, fabricate and evaluate the working efficiency, and performance of the proto-type.

Using basic engineering principles and some physical properties of Irish potatoes such as, size, density and weight of the tubers, the various components of groundnut planter will be designed that is, the seed hopper, Main frame, furrow opener, Seed metering mechanism and furrow covering assembly. The drive will be got from transport wheels to metering roller shaft by help of a chain and sprockets.

The proto-type was subjected to both on station and field testing;

The machine designed and constructed can improve crop and labour productivity and boost farmers' income while releasing valuable time for other activities. The proto-type can be adapted for use in Ugandan soil conditions. The technology should be utilized by a group of small-scale farmers to boost Irish potatoes production and rural development.

The project proposal embraces the project schedule and budget for the design, fabrication, and evaluating the row planter for Irish potatoes. The project is estimated to cost 814,000 Uganda shillings.

DEDICATION

This proposal is dedicated to my dear parents, Mr. **Kitiyo Fred** and **Miss. Chebet sophy**, who have devoted their valuable time and finances along the line of studies to me to reach this far. Above all, may the almighty God bless and reward you accordingly.

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I would like to extend and express my utmost gratitude to entire staff of Agricultural Mechanisation and Irrigation Engineering department for their efforts to provide with me all necessary knowledge and skills which has enabled me to carry out this project proposal.

Thanks go to my supervisor, **Mr Igga Hazairu** for devoting his valuable time in guiding me through this proposal writing and all necessary research I carried out. Your tireless efforts, encouragement, and critics are highly appreciated.

I am heavily indebted to thank all my colleagues in AMI-IV for whatever they have contributed to the success of this project proposal writing. May the almighty God keep and reward you accordingly.

DECLARATION

I, **MALINGA ELIUD** do hereby, declare that this final year project report is the original copy of my personal research carried out on the development of a one row animal drawn planter for Irish potatoes under serious supervision and it has never been submitted in for award of bachelor's degree in Agricultural Mechanization and Irrigation Engineering of Busitema University or any other institution of learning.

Author

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APPROVAL

This final year project proposal report has been submitted to the Department of Agricultural mechanization and Irrigation Engineering for examination with approval from:

Supervisor:

Name:.....

Signature.....

Date.....

LIST OF ABBREVIATIONS

FAO	Food and Agricultural Organisation
UBOS	Uganda Bureau of Statistics
NARO	National Agricultural Research Organisation
AEATREC	Agricultural Engineering and Appropriate Technology Research Centre
SAARI	Serere Agriculture and Animal Research Institute
HTT	Hand Tool Technology
SIAMMCO	Serere Industry and Manufacturing Metal Company
ICRISAT	International Crop Research Institute for the Semi-Arid Tropics **DAP**
	Draft Animal Power

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INTRODUCTION

1.1 Background

The commercial potato derived from the wild species *Solanum tuberosum* originates from the Andes in South America. Originally it was first cultivated next to the present border separating Peru and Bolivia some 8,000 years ago. The Spanish took the potato from Latin America to Europe in the 16th century. Potato was first admired for its flowers before being appreciated for its tubers and since then potato became a major carbohydrate source in human and animal diets around the world. Adaptation to long days **(Brown 2012; Hawkes 2014; 2016)** and generations of breeding led to a panel of potato varieties differing in taste, skin color, shape, starch content, cooking type, etc… The fast growing characteristic of potato allowed poor families to cultivate it on small plots and break the circle of poverty. Hundred millions of people around the world depend on potato to survive. Potato is grown in more than 100 countries, under temperate, subtropical and tropical conditions and ranks as the world's third most important food crop, after rice and wheat. China is now the largest potato producer followed by India, Russian Federation and USA. **(Hasankhani and Navid, 2012)**

In Uganda the Irish potatoes are the fourth largest food crop following rice, wheat and maize. In Uganda Irish potato is both a staple food and main source of income. The districts of Kapchorwa, Kween and Mbale in eastern Uganda are estimated to produce over 40% of the national crop. As a result of increased demand, especially in urban areas, production has been intensified in the traditional zones and it is spreading into central Uganda and South western Uganda **(Aliguma, Magala and Lwasa, 2015)**

Potato is mainly produced twice a year by smallholder farmers on rain fed conditions. Land size typically ranges from 0.2ha to 5ha. Farmers mainly use farm saved seed, manual labor and limited input. Common varieties in Uganda include: Victoria, Rwangume, Kabaale, Rutuku, Kinigi and NAKPoT (1, 2, 3, 4, and 5). Other local varieties include Cruza and Wanale mainly

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