



FACULTY OF ENGINEERING

**DEPARTMENT OF AGRICULTURAL MECHANISATION AND IRRIGATION
ENGINEERING**

DESIGN AND CONSTRUCTION OF CASSAVA STAKE CUTTING MACHINE.

BY

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ABSTRACT.

Cassava is one of the most important food crops grown in various parts of Uganda; - Several varieties of cassava are mostly grown due to tolerance in both poor soils and unreliable weather conditions. Cassava is a propagated plant with its stems being the leading source of planting material which affects the yields and results in low productivity depending on the method of preparation, Quality of stem and the time it's needed. The common method used for cutting is manual labor using a panga, machetes among a few which is labor intensive, time consuming and leads to drudgery that leads to unequal and bruised nodes on stakes which lower the stake viability which intern leads to low productivity.

This project undertook the development of a motorized cassava stake cutter with the aim of reducing on the drudgery during cutting operations and increasing the timeliness production of quality stakes. The main objective of the project was to design and construct a cassava stake cutter which will meet the production of the required stakes for mechanized and commercial farming per day. In achieving the above objective, basic engineering principles and the physical properties of cassava stems were considered in the design of the various components of the stake cutter. Appropriate engineering drawings were produced using solid edge and the designed stake cutter was constructed at Munyegera Workshop using the locally available materials (mainly mild steel) and common production technologies, including cutting, bending, welding, etc.

The performance of the constructed prototype was determined by the no of stems produced and there quality in terms of length bruised nodes etc. From the tests performed, it was found that the machine output capacity was 7500 stakes per hr., with up to 75% of the machine efficiency and 72% of the cutting efficiency. Thus the use of the machine has a big role in reducing drudgery and making farming attractive; thereby improving crop production and alleviating the labor shortages experienced during cutting. This increases the income and stem availability of poor resource farmers in Uganda.

DEDICATION

This final year project report is dedicated to my dear Mother, Mrs. Alima Mustapher who have struggled financially throughout my life and studies to see that I achieve my career objectives. May the Almighty God richly bless and reward her cordially.

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DECLARATION

I KWEMBOI SADAM declare that the work in this report was carried out in accordance with the Regulations of Busitema University. The work is original except where indicated by special reference in the text and no part of the project has been submitted to any other university for examination and degree award. Any views expressed in the project are those of the author and in no way represent those of Busitema University.

Signature

Date.....

APPROVAL

This is to certify that KWEMBOI SADAM prepared his final year project under the supervision of the following lecturers.

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MR. KAVUMA CHRIS. Signature.....

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DR. CATHERINE WANDERA. Signature.....

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ACRONYMS.

(NARO)-National Agricultural Research Organization

OECD-Organization for Economic and Commercial Development.

(USA)-United States of America

FAO-food and Agricultural Organization

IITA,-international institute of tropical Agriculture

(ZECC)- Zero Energy Cool Chamber

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CHAPTER ONE

1.1 BACKGROUND



Figure 1: cassava plant

Cassava (*Manihot esculenta*) is a very interesting root crop grown in many parts of the world and is considered as one of the most valuable staple food source for a huge number of people in tropical regions of the world, because of its efficient source of food energy, all year-round availability and tolerance of extreme environmental stresses making it suitable for farming [IITA, 1989]. The crop originated in South America, where its tubers have been used throughout the ages as a basic food; from there it spread to regions of the world. Currently, about half of the world's production of cassava is in Africa, and is cultivated in around 40 African countries with 45% of its contribution in the world. Throughout the forest and transition zones of Africa, cassava is either a primary staple or a secondary food staple in terms of calories consumed, Recently cassava has occupied a prominent place in National non – oil export commodity, especially exports in Sub –Saharan Africa that international demand is far above the supply (Fresco, 1993; Nweke *et al.*, 2002)

Uganda is ranked the sixth largest producer of cassava in Africa with 4.2 million metric tonnes having been produced, it is the second most important staple crop after bananas in the country (Kilimo Trust, 2012). The main cassava growing regions based on production volumes of 2008/2009 are; eastern region (37%), northern region (34%), western region (15%) and central region (14%). The national average yield of cassava is 12.5MT/ha with production being dominated by Smallholder having farm sizes of between 0.4 and 0.8 hectares.(Kilimo Trust, 2012).

The crop is grown for food and income and is traded as cassava flour (50%), dried cassava chips/pellets (45%) and raw cassava (5%) and also exports to the neighboring countries ,this has negatively affected local supply as it's mostly produced by rural small holder farmers , with the main source of planting materials from the farmers' fields, neighbors and sometimes

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