BUSITEMA UNIVERSITY
Pursuing Excellence

FACULTY OF ENGINEERING

DEPARTMENT OF AGRO-PROCESSING ENGINEERING

DESIGN AND CONSTRUCTION OF MOTORIZED PULSE DE-HUSKER

BY

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Declaration

I **KYAMANYWA BRIAN** hereby declare that, this report is a true work of my hands and has never been presented by any person or institution for an academic award

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Date: 12-06-2014

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Dedication

I dedicate this report to my dear aunt, **Ms.MBABAZI Grace**, in appreciation for her unspeakable support to me. Am very humbled and equally grateful for the support

Approval

This is to certify that this project proposal has been prepared under the supervision of my supervisors.

Main supervisor:
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Date .....

Co-supervisor:
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Date ..... 20/6/2014 .....

Abstract

The average protein content for de-husked legumes is 249g/kg and 44g/kg in husks and although the hull contains some nutrients, the protein and other nutrients content except ash in the cotyledon and other parts of the seed exceed by far the nutrient content in the hull, and the hull deteriorates the functional properties of the legumes). In addition, the testa during early post harvest handling of the pulses may carry pests, fungi and other microorganisms which may lead to the deterioration of the product

However, Uganda and other developing countries continue to export countries continue to export husk rich products which are low in nutrient content thus continue earning less foreign exchange than they would otherwise do. There may only be few ways to offset the challenges posed by the presence of the testa of the pulses but it is an undisputed fact that de-husking is the most effective method of improving the quality of the pulses cannot be disputed.

In doing this, many previous methods of de-hulling have concentrated more on purely chemical or physical methods of methods of removal as opposed to a combination of the methods in addition to being time consuming and inefficient.

This research therefore sought to design, construct a motorized pulse de-husker motorized pulse de-husker, and to evaluate the technical performance of the motorized de-husker and as well as carry out an economic and social evaluation of the machine.

These were done through carefully designing each component of the machine based on the various scientific principles, selection of materials to based in the construction, choosing the methods of fabrication and then assembling

The scope of the project was to de-husk legumes specifically cowpeas and beans.

This report contains chapter one which brings out the background on pulses, objectives the problem statement as well as justification and constraints. Chapter two highlights the technologies available for de-husking the pulses and explains why this de-husker should be the way to go.

Chapter three explains the steps that enabled me to achieve the objectives of this project, how it was evaluated and also the results of the project.

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List of acronyms

NARO	National Agricultural Research Organization
TNAU	Tamil Nadu Agricultural University
F.O.S	Factor of Safety
NARO	National Agricultural Research Organization
FAO	Food and Agricultural Organization
FFA	Free fatty acids
APC	Agricultural Policy Committee

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CHAPTER ONE

1.0 INTRODUCTION

1.1 Background

The Merriam Webster dictionary, defines pulses as the fruit or seed of plants of the legume family (such as peas or beans) used for food, or a vegetable used for food. Any of a large family (*Leguminosae syn. Fabaceae*, the legume family) of dicotyledonous herbs, shrubs, and trees having fruits that are legume or loments, bearing nodules on the roots that contain nitrogen-fixing bacteria, and including important food and forage plants (as peas, beans, or clovers

In Sub-Saharan Africa, the total area harvested to all food legume crops totaled 20 million ha in 2006/2008, which represents about 28% of global pulse area harvested. Of these 20 million ha, representing 54% of the area harvested, was under cowpea, 28% under dry beans and 18% under all other pulse crops. In the 1990s, West and Central Africa annually produced about 2.6 million tons: 2 of cowpea on 7.8 million hectares, accounting for 69% of the world's production and 80% of global area harvested (Langyintuo*et al.*, 2003).

Comprehensive studies to assess trends on food legumes production, consumption, and trade in Sub-Saharan Africa date back in the 1980s (Agostini and Khan (1986); Kelly, T.G, RaoParthasarathy and Grisko-Kelly H. (2003). More recently, Akibode and Maredia (2011) studied the global and regional trends of food legume production, consumption, and trade. In 2006-08, Sub-Saharan Africa accounted for 97% of the global cowpea harvested area and about 94% of global production. The cowpea yield in Sub Saharan Africa averaged 0.45 t/ha compared to global average yield of 0.46 t/ha. With a share of 94% of total area and 91% of total production, West Africa dominates the cowpea sector in Sub Saharan Africa. Compared to West Africa, cowpea is a 'minor pulse' crop in other regions of Sub Saharan Africa, ranging from a regional share of 6% of total continental production in East Africa, and the remaining 3% in Central Africa.

Dry beans are the second most widely cultivated pulse crop in Sub-Saharan Africa, representing about 28% of the total pulse harvested area (5.69 million ha) and 31% of total pulse production (3.50 million tons) in 2006-2008. Dry bean accounts for about 5.69 million ha of area cultivated

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