BUSITEMA UNIVERSITY
Pursuing Excellence

FACULTY OF ENGINEERING

DEPARTMENT OF AGRICULTURAL MECHANIZATION AND IRRIGATION ENGINEERING

DESIGN AND CONSTRUCTION OF AN IMPROVED MULTI-CROP ENGINE POWERED THRESHING AND SEPERATION MACHINE FOR LEGUMES

BY

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A final year project report submitted to the Department of Agricultural Mechanization and Irrigation Engineering as partial fulfillment of the requirements for the award of Bachelor of Agricultural Mechanization and Irrigation Engineering of Busitema University

May 2016

EXECUTIVE SUMMARY

Threshing is one of the most important activities carried out in primary processing of legumes. It is aimed at dislodging seeds/grains from the pods and these legumes include common beans, soya beans and peas.

Most farmers in Uganda grow a number of legumes at different seasons and these crops all under the primary processing of threshing in which they majorly dependent elementary methods of threshing which are Labour intensive, time consuming and wasteful in that seeds get damaged. However, the existing machines are only limited to one crop causing machine redundancy and have low cleaning efficiency thus relying on manual power for cleaning.

The machine was aimed at minimizing the problem of machine idleness and improving the efficiency of seed separation from physical contaminants putting into consideration the physical properties of all legumes.

In this project, an optimum performance was obtained at feed rate of 0.025Kg/s giving TE=98.9%, CE=89.5% MD=0.4% and total Machine output of 52Kg/hr. for soya beans, 0.042Kg/s giving TE=98.7%, CE=92% MD=0.66% and total Machine output of 69Kg/hr. for common beans. However, there is a problem of clogging at the chaff outlet, machine immobility and bulkiness that still needs more attention.

In order to maximize the cleaning efficiency of the machine, option of incorporating a shaking sieve should be considered. Furthermore, ground tyres should adopted to permit machine mobility.

DEDICATION

This project report is dedicated to my beloved Grandmother, Mrs. Katerina E'yoru, for the moral guidance and parental love. God bless you.

ACKNOWEDGEMENT

I am very grateful to God almighty for the wisdom and protection during the execution of this project and my academics as a whole.

Special thanks to the management of Busitema University for divulging in us knowledge and skills of finding realistic solutions to problems facing the communities and the world at large.

I extend my gratitude to the supervisors Mr. Okirya Martin and Dr. Musinguzi Wilson Babu for the guidance towards successful completion of the project.

My heart felt gratitude to my parents, Yoana Abiriga and Tereza Enzaaa, for the financial support and the family of Taaka Annet (Mrs. Taaka Annet, Mrs. Nabwire Christine and children) for the material assistance towards this project, my academics and welfare in general.

I finally appreciate the contribution of BIF Investments Ltd, Kiyengo Solomon, Baraza Gerald, Zirabamuzale Peter, Kiiza Solomon, Muhereza Martin, all course mates, roommates and friends who had a hand towards the success of this project.

God bless you all.

DECLARATION

I, **Oneti Geofrey**, do declare that this proposal is the original copy of the work compiled from various literatures gathered from different sources and has never been submitted before, for the award of Bachelor's degree in Agricultural Mechanization and Irrigation Engineering or any award of the same kind.

SIGNED: .....

DATE: 30/05/2016

APPROVAL

This proposal has been submitted to the Department of Agricultural Mechanization and Irrigation Engineering for examination leading to the award of Bachelor of Agricultural Mechanization and Irrigation Engineering with my approval.

MAIN SUPERVISOR

NAME: ..... SIGNED: .....

CO-SUPERVISOR

NAME: ..... SIGNED: .....

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

ACRONYMS

FAO – Food and Agriculture Organization

GDP – Gross Domestic Product

PTO – Power Take Off

UEPB – Uganda Export Promotion Board

WFP – World Food Program

CGIAR – Consultative Group on International Agricultural Research

IITA – Inter-American Institute for Cooperation on Agriculture

CHAPTER ONE

1.0 INTRODUCTION

This chapter is about background to the study, problem statement, justification, objectives and scope of the study.

1.1 Background to the Study

Threshing is one of the most important activities carried out in primary processing of legumes. It is aimed at dislodging seeds/grains from the pods and these legumes include common beans, soya beans and peas.

Most farmers in Uganda use elementary methods of threshing legumes which are Labour intensive, time consuming and wasteful in that seeds get damaged.

In an attempt to solve the above problems, (Onziga. 2014) came up with a design of a motorized bean thresher which had a number of limitations

- Limited to only beans alone yet there are a number of crops that undergo threshing operation causing machine redundancy
- The machine was unable to separate the seeds from the chaff and this increases the dependency on manual power

Basing on the limitations above, my machine is aimed at minimizing the problem of machine idleness and improving the efficiency of seed separation from physical contaminants putting into consideration the physical properties of all legumes.

1.2 Problem Statement

Most farmers in Uganda grow a number of legumes at different seasons and these crops all under the primary processing of threshing which is so demanding in terms of Labour, tiresome and time consuming.

However, the designed machine (Onziga. 2014) is only limited to one crop and this prompts farmers to look for other alternatives for rest of the crops which is costly. This necessitates the design of a multi-crop thresher to eliminate the demand for other machines.

Besides the efficiency of cleaning and separation of seeds from the chaff is low (46%) which calls for an improvement so as to minimize human drudgery of manually collecting the threshed seeds for winnowing.

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