BUSITEMA UNIVERSITY
*Pursuing Excellence*

# FACULTY OF ENGINEERING

## DEPARTMENT OF AGRICULTURAL MECHANISATION

## AND

## IRRIGATION ENGINEERING

# FINAL YEAR PROJECT REPORT

## DESIGN AND CONSTRUCTION OF A MOTORIZED CARROT CHOPPING MACHINE FOR THE FOOD SERVICE INDUSTRY

**By**

**KIIZA HENRY**

**(BU/UP/2014/165)**

Email: henrykiiza3@gmail.com

Tel: +256 788605671/ +256 705693905



**SUPERVISORS**

MR. MAKUMBI THOMAS

Ms. NABATEREGA RESTY

A final Year Project Report is submitted to Busitema University in partial fulfillment for the Bachelor's degree in Agricultural Mechanization and Irrigation Engineering

**May 2018**

## ABSTRACT

This project report describes the design and construction of a motorized carrot chopper aimed at saving time during chopping and eliminating cases of contamination of the final product.

Chapter one entails the background of the study, a statement of the problem, purpose of the study, the objectives (main and specific objectives) and the scope which clearly highlights the limitations of the study.

Chapter two digs deeper into the historical origins of carrots clearly elaborating their production trends in the world and Uganda in particular. Varieties/types, food values, nutritional benefits and post-harvest operations of carrots are elucidated in this wonderful chapter. The climax of this section incorporates an overview of the existing methods of chopping carrots, and a universal description of the concept of material selection.

Chapter three of this scientific literature involves the principles, methods, techniques and theories that was applied in an attempt to achieve the set objectives of the undertaking.

The machine was designed with an output capacity of 145.8kg/hr and efficiency of 57.3%



**Keywords**: carrot Chopper, Design, construction, motorized operation.

## DECLARATION

I **KIIZA HENRY BU-UP-2014-165,** hereby declare that this final year project report is the original copy of my personal research carried out in a bid to construct a motorized carrot chopper under sincere supervision. No portions of this report are duplicated unless cited and it has never been submitted in any institution of learning for the award of a bachelor's degree in Agricultural Mechanization and Irrigation Engineering.

Author Name: KIIZA HENRY

Signature.....

Date.....04/06/2018.....

## DEDICATION

I dedicate this report to my parents Mr. Byakagaba Patrick and Mrs. Kagaba Firidah, sisters especially Mrs.Bintu Jalia lukumu and brothers for committing time and resources that catapulted me to this greater academic horizon.

Cordial dedication of this report goes to my beloved supervisors Mr. Makumbi Thomas and Ms. Nabaterega Resty for the constructive ideologies and advice that were so monumental during the preparation of this final year report.

Final dedication goes to all my concerned relatives and well-wishers who have been there to illuminate the dark days of my life throughout the academic hustle.

## ACKNOWLEDGEMENT

My sincere thanks go to the Almighty God for the wisdom, knowledge, grace, mercy, and protection He has given to me throughout this undertaking.

I sincerely acknowledge the efforts of my supervisors; Mr. Makumbi Thomas and Ms. Nabaterega Resty, not forgetting Dr. Wandera Catherine for the support rendered to me in preparation of my project work of this wonderful project.

With much gratitude, I extend my appreciation to all the departmental lecturers of Agricultural Mechanization and Irrigation Engineering, Busitema University who tirelessly equipped me with knowledge, skills and resilience to sail through the proclaimed 4-year academic hurdles.

In a nutshell, I acknowledge my parents, brothers, sisters, concerned relatives, classmates and friends who willingly offered in a hand that has finally catapulted me to the apex of this auspicious stage of academic horizon.

## TABLE OF CONTENTS

## ACRONYMS/ABBREVIATIONS

MAAIF – Ministry of agriculture, animal industry and fisheries

FAO – food and agriculture organization

FFV – fresh fruits and vegetables

USDA – United states Department of Agriculture

g – grams

URA- Uganda revenue authority

NBV- net book value

## LIST OF FIGURES

## LIST OF TABLES

# CHAPTER ONE: INTRODUCTION

## 1.0 Introduction

This chapter discusses the background of carrot in the world and Uganda in particular, the problem statement, the objectives of the project, the reasons as to why the project should be carried on, giving its purpose and finally the scope of the project.

## 1.1 Background of the study

Carrot (*Daucus carota.*) is biennial vegetable whose tap root is edible and is the most important root vegetable plants grown worldwide and the major vegetable umbellifer crop of the family Apiaceae (Umbelliferae) (Simon *et al.*, 2008). Carrot plants comprise of two parts: the storage root and the tender foliage. The root is the most consumed portion of the plant; however, in China and Japan, the tender young foliage is occasionally used in stir-frying or salads (Rubatzky *et al.*, 1999). Appreciable amounts of vitamins such as β-carotene, ascorbic acid, vitamin B, and tocopherol are found in the roots (Hashimoto and Nagayama 2004). Due to the presence of these compounds, carrot is considered as a functional food with potential health benefits for human (Hager and Howard 2006; Nicolle *et al.* 2003).

The roots are usually orange in color, although purple, black, red, white and yellow exist which is extensively grown in the world as a source of several vitamins and minerals. (Okello *et al.*, 2010). Carrot is among the top-ten most economically important vegetable crops in the world, in terms of both areas of production and market value. (Vilela, 2003; Vilela, 2004).

Common Carrot varieties in Uganda include; Nantes, Chantenay, Miniature, Imperator, Danvers. (Zandstra *et al.*,1986).

The leading carrot growing areas in Uganda include Ntungamo (Rushenyi county,Rwahi town), Elgon ranges [Bududa, Kween, Bukwo and Kapchorwa districts], Kumi, Kamuli, Soroti, Kasese and on various irrigation schemes across Uganda such as Mubuku irrigation scheme. (MAAIF,2008). The commonly cultivated variety in Uganda is the orange carrot.

Traditional method of hand chopping of carrots with knives is the only available and affordable way in most hotels, restaurants and functions across Uganda (Kent,2008). This method is laborious, time consuming, and gives low throughput. It involves too much body contact with

## REFERENCES


ArScot S.a., tanumihardio S.a. 2010. Carrots of many colors provide basic nutrition and bioavailable phytochemicals acting as a functional food. Comprehensive Reviews in Food Science and Food Safety.

Dorant. (1998). a prospective cohort study on allium vegetable consumption.

persson. (1987). Mechanics of cutting Plant Material.

Bhandari. (2007). *Design of Machine Elements, Second Edition, ISBN 0-07-061141-6,9780-07-061141-2,* .McGraw-Hill Companies.

Ayo A.S, Bonabana-Wabbi J, Sserunkuuma .D 2012. Determinants of Fast Food Consumption in Kampala, Uganda. African Journal of Food Agriculture, Nutrition and Development 12(5):6567-6581.

Ubos, 2010. Uganda census of agriculture 2008/2009, Volume IV: Crop Area and Production Report, Available at: www.ubos.org.

Khurmi, R. &. (2005). A textbook of machine design (14th edition). New dellhi: Eurasia Publishing House.

Key, T. J., Appleby, P. N., Travis, R. C., Albanes, D., Ahlberg, A. J. Barricarte, A., Allen, N. E. (2015, October 7). Carotenoids, retinol, tocopherols, and prostate cancer risk: Pooled of 15 studies [Abstract]. *American Journal of Clinical Nutrition 102*(5), 1142-1157.

Ogwal, F. (2010). horticulture production and biodiversity in Uganda.

Srivastava, A. G. (2006). *Hay and Forage Harvesting.*