

**BUSITEMA
UNIVERSITY**
Pursuing Excellence

**FACULTY OF ENGINEERING
DEPARTMENT OF AGRO-PROCESSING ENGINEERING**

**DESIGN AND CONSTRUCTION OF AN IMPROVED GROUNDNUT
SHELLER**

BY

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DEDICATION

I dedicate this report to my wife Esther and son Einstein, my parents; Mr. and Mrs. Efumbi Pataleo who have raised me up, given me financial assistance, parental guidance and counseling plus encouragement in all my academic endeavors.

DECLARATION

I, WAFULA SIMON PETER, hereby declare to the best of my knowledge that this project report is an outcome of my own work and has not been presented for any academic award in any university, college or higher institution of learning. Throughout the work I have acknowledged all other sources in its compilation

Name: Wafula Simon Peter.

Signature.....

Date.....

APPROVAL

This report is a confirmation of the successful accomplishment of a project entitled “Design and construction of a manually operated groundnut decorticator” and is as a result of personal hard work under the supervision of the following;

Supervisors:

Mr. Otim Daniel

Signature.....

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Signature.....

Date.....

ABSTRACT

In Uganda, traditional methods are used for shelling groundnuts. These include, beating with sticks on a flat surface and the use of hands. These are all laborious. There are many mechanical shellers on the market that can shell at a rate of up to six bags every hour. The hand cracked, the tyre manual type and the motorized ones are quite expensive for the farmers and are also associated with high levels of kernel breakage.

Therefore the objective of this study was to design and construct an improved manually operated groundnut sheller aimed at addressing the problem of kernel breakage by ensuring that the right groundnut size is shelled by the rightful sieve and clearance at the cheapest cost possible. This machine presented a cheap, effective, sustainable and affordable tool to small scale processors and farmers for shelling groundnuts without many limitations since it is actually be operated without a power source making it both cost effective and easy to be operated. (W.W.,et al. 2002),

The design of the various machine parts was carried out by analyzing forces acting on them. Force analysis led to selection of proper materials to withstand the forces to avoid failure. Mild steel of various sizes and grades were used, engineering drawings of the various components were drawn before the various components were constructed.

Then prototype assembly was done last according to the engineering drawings. A fully functional prototype resulted after all the above operations.

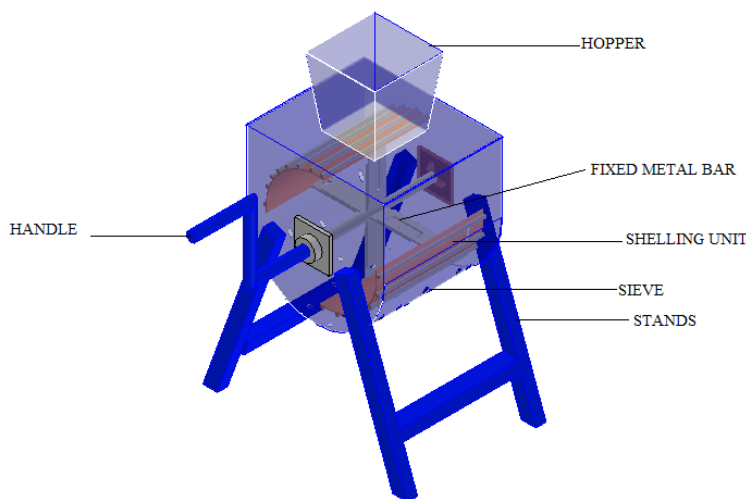
Testing of the prototype was carried out and the figures revealed that the machine had an efficiency of about 81% and a shelling capacity of 108kg/hour and the shelling loss of about 8.6%.

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LIST OF ACRONYMS

CPPR -Crop Protection Program report

ICRISA -International Crops Research Institute for Semi-Arid Tropics.

LRA -Lord's Resistance Army.

NAADS – National Agricultural Advisory Services.

NGO- Non-Governmental Organization.

CHAPTER ONE. INTRODUCTION.

1 INTRODUCTION

This chapter presents the background of the study and its significance in the development of the Agro processing industry in Uganda

1.1 Background of the Study

Groundnut (*Arachis hypogaea* L.), also known as peanut, is the second most important legume after beans (*Phaseolus vulgaris* L.) (Okello et al. 2010)

It is an oil seed legume that grows underground and it is covered in a hard pod. Maturity takes about 10 to 13 weeks from time of planting depending on the variety of the seed, the moisture content in the soil and the nutrient levels. (Gitau, 2013)

The pod is harvested by pulling or lifting the plant manually or by using a hoe as the mechanization system. They are stripped from the haulms, dried, stored and processed thereafter packaged and taken for sale. (Gitau, 2013)

Groundnut as a crop generally requires few inputs, making it appropriate for cultivation in low-input agriculture by smallholding farmers. It gives relatively high returns for limited land area and is well adapted to the hot, semi-arid conditions of Uganda. As compared to other crops, groundnut is a very highly nutritious legume that contains 19% proteins, 6.5% fats, vitamin E, niacin, folic acid, calcium, phosphorus, magnesium, zinc, iron, riboflavin, thiamine and potassium. (Okello et al. 2010)

It is consumed all over Uganda as either raw seed, groundnut paste, peanut butter also known as odii, roasted seed, and also eaten as seed. It is also used as an ingredient for several products in many Agro-processing industries in making baby porridge flour, used in confectionary (making of sweets and chocolates). The straw, stems are commonly used as animal feed. Groundnuts also improve soil fertility by fixing nitrogen using their root nodules. (Economics 2014)

The varieties of groundnuts grown in Uganda include; Igola 1, Serenut 1 and 2, Serenut 11, Red Beauty among others. The Serenut varieties are resistant to diseases like rosette disease that affects the Red Beauty so much. (Economics, 2014)

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