



**BUSITEMA
UNIVERSITY**
Pursuing Excellence

FACULTY OF ENGINEERING

**DEPARTMENT OF AGRICULTURAL MECHANIZATION AND IRRIGATION
ENGINEERING**

**DESIGN AND CONSTRUCTION OF A MOTORIZED CASSAVA PEELS GRATING
MACHINE.**

CASE STUDY AREA IN KUMI

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Abstract

Uganda is one of the top producers of cassava in Africa. Uganda's annual cassava production is 3.5 million tons, grown on an estimated 0.4million hectares (www.fao.org, Article by Kalyango Ronald), and that it is the second most important staple food after bananas. Cassava root is the third-largest source of food carbohydrates after rice and maize and it gives third highest yield of carbohydrates per cultivated area among crop plants, However, the roots are rich in calcium and vitamin C and contain a nutritionally significant quantity of thiamine, riboflavin and nicotinic acid. The products from cassava tuber processing include; Cassava flour, Cassava chips, Cassava breakfast/snack flakes, Starch, Glue, Ethanol, Cassava leaves, Fresh roots and Cassava and the byproduct of cassava is cassava peels as ingredient for Animal feeds. However wet cassava peels contain high moisture content and quickly deteriorate. In addition, fresh cassava peels contain hydrocyanic acid which generates free cyanide and this calls for pounding by using a grating machine. A motorized cassava peels grating machine was designed, fabricated from Busitema university located in the eastern region of Uganda. The materials chosen were basing mainly on the cost, availability and workability.

The machine attained an average efficiency of 68.3 % at feed rate of 0.046kg/s after with the different masses of cassava peels. The machine can be used in production by both medium and large-scale processors to grate cassava peels. Also, the machine is cheap and affordable in terms of power requirement, its maximum power requirement is 3HP.

The machine has the NPV of **352,946UGX** and the payback period of **1.2years**making viable with the initial investment of **1,145,755UGX** having the selvage value of **561,419.95UGX**, hence makes the machine to attract the processors of the cassava and cassava peels.

The cassava peels grating machine comprises of the process system and the support system and these include; the feed hopper, crusher drum, main rotating shaft, cylindrical regulatory plate, main frame and power unit.

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I as well love to extend great thanks to my parents and brothers especially Ivan for their financial support, care and encouragement and my supervisor in all the endeavours.

I also thank the Department of Agricultural mechanization and irrigation for the pieces of advice.

DECLARATION

I chesang Calvin, declare to the best of my knowledge that this Report is as a result of my research and effort and it has never been submitted or presented to any University, College or any other Institution for an academic award.

Signature.....

Date.....

APROVAL

This is to certify that this report was written by chesang Calvin in fulfillment of research as part of my academic processes under supervision.

Supervisor

Name.....

Signature.....

Date.....

DEDICATION

This report is firstly dedicated to the Almighty God because by his grace I have been able to come from far in all my academic process secondly onto my beloved parents for their efforts more financially and other things towards my education and also my fellow friends whom have been around me.

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LIST OF ABBREVIATIONS

- FAO** - Food and Agriculture Organization
- ASTM** - American Society for Testing and Materials
- ASME** - American Society of Mechanical Engineers
- EAC** - East African Community
- Ha** - Hectares
- HP** - Horse Power
- MAAF** - Ministry of Agriculture Animal and Fisheries
- Mt** - Metric tones
- MS** - Mild Steel
- UEPB** - Uganda Export Promotion Board
- UBOS** - Uganda Bureau of Statistics
- PV** - Present Value
- NPV** - Net Present Value

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