



**BUSITEMA  
UNIVERSITY**  
*Pursuing Excellence*

**FACULTY OF ENGINEERING  
DEPARTMENT OF CHEMICAL & PROCESS ENGINEERING  
FINAL PROJECT REPORT**

**DESIGN & CONSTRUCTION OF A MOTORISED MAIZE FLOUR MINGLER**

BY

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**A final year project report submitted in partial fulfilment of the requirements for the  
award of the BSc. In Agro- processing engineering of Busitema University.**

## DECLARATION

I **ARIKOSI LUKE ONORIA** declare that all that is written in this proposal report is my original work and has never been presented for any academic award in any university or any institution of higher learning since plagiarism is an offence.

Signature: .....  .....

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**APPROVAL**

This is to approve that this proposal has been written with full knowledge and consistently worked upon and submitted to the department of chemical and processing engineering under the supervision of the university supervisor.

Supervisor

.....

Signature

.....

## **DEDICATION**

This report is dedicated to my beloved parents Mr. Okello Andrew Kaggwa and Ms. Isukali Immaculate in appreciation for their selfless care and unflinching support provided to me since childhood, and for the spirit of hard work, courage and determination instilled into me, which attributes I have cherished with firmness and which have indeed made me what I am today.

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The Almighty God bless you abundant

## **ABSTRACT**

The study goes through the step by step procedures which led to the achievement of the intended main and specific objectives. The designed maize flour mingler machine of capacity 2kg comprised of inner and outer jackets of the pan, the frame and a two way opposite rotation of the mingling pan and the mingling shaft. This machine was designed, fabricated and tested to examine its performance. The mingling machine is essential in production of a large amount of posho within a shortest time possible. The results of this study were discussed and it was found that the machine works moderately effective compared to existing traditional method of posho mingling which is laborious with its associated problems.

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## **ABBREVIATIONS AND ACRONYMS.**

**UBOS** - Uganda National Bureau of Standards

**MS**- Mild steel.

**USD** – United States Dollars

**UIRI** – Uganda Industrial Research Institute.

**RH** – Relative Humidity.

**FAO** – Food and Agricultural Organization

**HP** – Horse Power.

**ROCI** – Return On Capital Invested.

**NPV** - Net Present Value

$\rho$  - Density

**T** - Torque

$\omega$  – Angular Velocity.

**g** – Acceleration due to gravity

# CHAPTER ONE: INTRODUCTION

## 1.1 Background

Maize (*Zea mays*), also called corn is the most important cereal in Uganda providing 40% of the calories consumed in both rural and urban areas. It contains approximately 72% starch, 10% protein, and 4% fat supplying an energy density of 365 Kcal/100g (UBOS, 2010).

Maize mingled flour locally known as **Ugali** in Kiswahili, **bando** in Lusoga, **kawunga** in Luganda, **buusima** and others is made up of finely ground white maize(corn) flour mixed with boiling water until it becomes a solid.

Maize flour preparation in Uganda is only done manually by use of hand and mingling sticks and no mechanical method has been used yet. Mechanical means of preparation have not been widely used throughout the whole world but was once experimented by Zack Salawe Mwale in Zambia 2014 who made a posho cooker where you simply add water and flour in the machine and cook.

Maize flour is locally prepared by; boiling water, mixing the maize flour in boiling water and stirring(mingling) for long time until it gets thick. The mingling duration may range from 15-20 minutes. And once the posho is ready (doesn't taste raw and floury), the pan is covered and fire reduced so that posho can cook in its own steam.