

---

**FACULTY OF ENGINEERING**

---

**DEPARTMENT OF AGRICULTURAL MECHANIZATION AND IRRIGATION  
ENGINEERING**

---

**FINAL YEAR PROJECT.**

**DESIGN AND FABRICATION OF A PEDLE OPERATED SWEET POTATO SLICING  
MACHINE.**

**AODI NABOTH**

**BU/UP/2017/140**

**0771970600/0753023177**

**[aodinaboth@gmail.com](mailto:aodinaboth@gmail.com)**

**A FINAL YEAR PROJECT REPORT SUBMITTED TO THE FACULTY OF  
ENGINEERING AS A PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE  
AWARD OF A BACHELOR'S DEGREE IN AGRICULTURAL MECHANIZATION AND  
IRRIGATION ENGINEERING OF BUSITEMA UNIVERSITY**

**JULY 2021-MARH 2022.**

**DECLARATION**

I AODI NABOTH declare to the best of my knowledge that the piece of this project proposal is as a result of my research and effort and it has never been presented or submitted to any institution or university for an academic award.

DATE .....

SIGNATURE .....

**APPROVAL**

This project has been submitted for examination with approval from the following supervisors:

**MR. WANGI MARIO GODFREY.**

SIGNATURE .....

DATE .....

**PROF KANT KANYARUSOKE**

SIGNATURE .....

DATE .....

## **ACKNOWLEDGMENT**

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

I am indebted to my parents, brothers, sisters, relatives, classmates and friends who have assisted me through guidance and support.

Am highly indebted to the Head of Department Agricultural mechanization and irrigation Engineering Busitema University faculty of engineering, Mr. Eriau Emmanuel, my supervisors Mr. Wangi Godfrey and prof Kant Kanyarusoke and all the other lecturers in the department for their moral and academic support through the course of my journey in the University Finally I am grateful to my classmates, friends and siblings for their guidance and support while at the University.

## **ABSTRACT**

Sweet potato which is ranked the 7<sup>th</sup> among foods consumed in the world, is one of the major food crops in Teso region. During periods of harvest surplus of the sweet potatoes needs to be persevered and consumed at later times. This calls for slicing majorly done using rudimentary tools which is tedious and produce non uniform slices and consume time.

There are many electrical, manual and motor operated machines in the market but the favour local farmers.

The main objective of this project is, to design and fabricate a pedal peeled sweet potato slicing machine. while the specific objectives are to carry out a detailed design analysis of the different components that make up the intended potato slicer, to fabricate the different components of the designed potato slicing machine and assemble the prototype, to test the fabricated prototype to determine the performance of the machine and to carry out economic evaluation of the designed sweet potato.

## Contents

DECLARATION .....	i
APPROVAL.....	ii
ACKNOWLEDGMENT.....	iii
ABSTRACT.....	iv
CHAPTER ONE .....	1
1 INTRODUCTION .....	1
1.1 Background. ....	1
1.2 Nutritional value of sweet potatoes .....	3
1.3 Problem statement .....	3
1.4 Objectives of the study .....	3
1.4.1Main objective .....	3
1.4.2 Specific objectives.....	3
1.5 Scope of the study. ....	4
1.6 Justification. ....	4
CHAPTER TWO. ....	6
2.0 LITERATURE REVIEW .....	6
2.1 BRIEF DESCRIPTION OF SWEET POTATOES. ....	6
2.2 USES OF POTATOES.....	6
2.3 REASONS FOR SLICING POTATOES.....	7
2.4 EXISTING TYPES OF SWEET POTATO SLICING MACHINES.....	7
2.4.1 Motorized potato slicing machine machines.....	7
2.4.2 Manual driven potato slicer.....	8
2.4.3 A wood with a knife embedded slicer.....	9
CHAPTER 3: .....	11
3.0 METHODOLOGIES. ....	11
3.1 specific objective one to design the different components of the sweet potato slicer.....	11
3.1.1 Data collection methods .....	11
3.1.2 Identification of the functions of the sweet potato slicing Machine.....	11
3.1.3 Design considerations .....	11
3.1.4 Conceptualization of the Sweet potatoes Slicing Machine .....	12
3.1.5 Mechanism of Operation of a sweet potatoes slicing Machine .....	13
3.1.7 Selection of Materials for the Different Components. ....	18

SPECIFIC OBJECTIVE TWO .....	20
3.2 FABRICATION AND ASSEMBLING OF THE PROTOTYPE .....	20
3.2.1 Fabrication processes.....	20
3.3 Testing the prototype and performance evaluation. ....	21
3.3.1 Efficiency .....	21
3.3.2 Losses .....	21
3.3.3 Output.....	22
4 Economic analysis of the machine.....	32
CHAPTER 4 .....	22
4.0 RESULTS AND DISCUSSION.....	22
4.1 Design specifications.....	22
4.2 Volume of hopper and weight of the hopper.....	22
4.2.1 Volume .....	22
4.2.2 Weight of hopper.....	22
4.2 Volume of the circular disc and its weight.....	23
4.2.1 Volume of the disc. ....	23
4.2.2 Weight of the disc.....	23
4.3 Volume and weight of the delivery chute.....	23
4.3.1Volume.....	23
4.4 Total weight acting on the machine. ....	24
4.5 Pedal power and speed and shaft design. ....	24
4.5.1 Determination of torque produced at driving sprocket .....	24
4.5.2 Velocity ratio.....	25
4.5.4 Twisting moment. ....	25
4.6 Design of chain and sprocket.....	26
4.6.3 Tension in the chain .....	28
4.7 The frame/ support stands. ....	28
4.7.1 Determination of forces acting on the frame.....	28
4.8 Testing of the machine. ....	29
4.8.1 Efficiency, losses and output of the machine. ....	29
4.9 Economic Evaluation of the Prototype .....	30
CHAPTER FIVE .....	34
5 CONCLUSIONS AND RECOMMENDATIONS.....	34

5.1 CONCLUSION.....	34
5.2 RECOMMENDATIONS.....	34
REFERENCES.....	35
APPENDICES.....	36
Budget.....	<b>Error! Bookmark not defined.</b>

LIST OF FIGURES.

Figure 2 1 motorised slicing machine .....	8
Figure 2 2 shows amotorised sweet potato slicing machine .....	<b>Error! Bookmark not defined.</b>
Figure 2 3 shows mannusl sweet potato slicing machine.....	9
Figure 2 4shows wooden slicer with knife embedded in it .....	9
Figure 3 1 shows conceptual diagram of sweet potato slicer.....	13

List of tables.

table 3 1 material selection for different components.....	19
table 3 2 shows construction methods and tools used .....	20
table 4 1 shows test results for the machine.....	29
table 4 2 shows budget.....	30
table 4 3 shows economic anjalysis. ....	32