



FACULTY OF ENGINEERING

**DEPARTMENT OF AGRICULTURAL MECHANIZATION**

**AND**

**IRRIGATION ENGINEERING**

**Final Year Project**

**DESIGN AND FABRICATION OF AN ENGINE OPERATED TURMERIC GRINDING  
MACHINE**

**By:**

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**BU/UG/2017/27**

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A final year project report submitted to the department of Agricultural Mechanization and Irrigation engineering in partial fulfillment of the requirement for the award of a Bachelor of Science in Agricultural Mechanization and Irrigation Engineering of Busitema University.

**MARCH 2022**

## ABSTRACT

Turmeric grinding is one of the most important stages in turmeric processing. In the grinding process, materials are reduced in size by fracturing them, the material is stressed by the action of mechanical moving parts in the grinding machine.

Local farmers undertake the grinding process of turmeric by use of manual methods for example grinding stones, mortar and pestle. These methods produce low quality powder that is to say; powder contaminated with dirt, small stones and small wood particles which prove to be dangerous to human health. In addition, the methods are time consuming (farmers spend several hours only to finely grind 0.4kg/hr of dry rhizome manually basing on the physical capability of the person) and tedious (pestle weighs up to 4kg). The automatic machines have a very high initial and maintenance cost.

The purpose of this project was to design and construct engine powered turmeric grinding machine for helping turmeric farmers improve on the quality of the ground turmeric powder (free from contamination) which would yield high market prices hence improving their economic wellbeing. Also increase on productivity.

The design and construction of an engine powered turmeric grinding machine consisted of determining the appropriate angle of repose for the turmeric rhizome, analysis of forces acting on the machine components to avoid failure during operation. Force analysis led to selection of proper materials to withstand forces. Stainless steels of various grades were the main materials recommended to be used because they are food grade, strong and durable. Engineering drawings of the various components were designed before the grinding machine was constructed and assembled.

The turmeric grinding machine was successfully constructed and tested with an efficiency of 98.3% and capacity of 100kg/hr. The machine can be used in production by small, medium and large-scale processors for quick, cheap and hygienic way to grind turmeric to powder due to high grinding efficiency and capacity. Also, the machine is cheap and affordable in terms power requirement, its maximum power requirement is 9HP. however during grinding, some unground particles tend to be kicked out through the feed gate. This is attribute to the type of hopper used.

The machine has an NPV of Ushs368,384,867.8 for a period of 3 years. Hence the initial investment of Ushs1,300,000 and a salvage of Ushs 579,670. The cost of the machine is relatively, hence the machine would be welcomed by local farmers and processors.

## DECLARATION

I **KATANGA JOEL**, hereby declare to the best of my knowledge, that this project report is an outcome of my original work and that it has not been presented to any institution of learning for an academic award.

Date .....

Signature.....

## APPROVAL

This final year project proposal for the program of Agricultural Mechanization and Irrigation Engineering has been submitted to the Department of Agricultural Mechanization and Irrigation Engineering for examination with the approval from the following supervisor.

### **Supervisor**

Mr. OBETI GRISM LAWRENCE

Signature .....

Date .....

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## DEDICATION

I dedicate this report to the entire family of **Mr. KADOKO NSEKEIRE EDWARD GRACE** and **Mrs.NANTABA JENNIFER** for the good support provided unto 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, may God's WILL be upon them.



## ACKNOWLEDGEMENT

My gratitude goes to Almighty God for guidance, protection and provision throughout the preparation of this work. I am particularly grateful to my supervisor; Mr. Obeti Grism Lawrence and the project coordinator; Mr. Ashabahebwa Ambrose for their academic and moral contribution in the completion of this work. This appreciation is extended to all friends and fellow Agricultural mechanization Engineers, and the Technical staff of Grace Engineering Works in Jinja District (Buwekula), who contributed in helping me to make this work a reality

I extend sincere gratitude to my parents Mr. Kadoko Edward Grace and Mrs.Nantaba Jennifer for the continued support they have rendered to my academic journey.

I thank my Supervisor, for the guidance in writing this project report.