

**DEPARTMENT OF AGRICULTURAL MECHANIZATION AND IRRIGATION
ENGINEERING**

PROJECT TITLE

**DESIGN AND FABRICATION OF AN ENGINE-OPERATED BANANA STEM CHOPPING
MACHINE.**

BY

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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 of the award of a BSc in agricultural mechanization and irrigation engineering of Busitema University

ABSTRACT

The banana plantain is a semi perishable crop and large quantity of the stem is wasted due to deterioration during the peak of harvest. The farmers dealing in the rearing of the animals use manual methods to chop the banana stems in order to supplement feeds to the animals but these methods produce low production of the chopped feeds, in addition, the methods is time consuming. The main objective is to design and fabricate the banana stem chopping machine and this design will focus on the capacity, material selection, maintenance and the cost must be considered. The banana stem chopping machine when fabricated, will consist of Notched Rammed shaft, Cutting blades, Main shaft, Belts, Pulley, Engine, Frame, Top cover, Carrie, Blade cover, Wheels, a rectangular frame made of angle iron bar welded together, grooved pulley, V-belt connected to both pulleys for power transmission and the performance will be evaluated.

DECLARATION

I **KIIGE CHARLES**, hereby declare, that this project proposal report is the true work of my original input and that it has never been presented to any University and any other institution of learning for any academic award.

Date

Signature.....

APPROVAL

This final year project proposal for the program of Bsc. in Agricultural Mechanization and Irrigation Engineering is submitted to the Department of Agricultural Mechanization and Irrigation Engineering for examination with the approval from the supervisor.

Supervisor

MR. ODONG SAMUEL ATOCHON

Signature

Date

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DEDICATION

I dedicate this report to those in the field of Agricultural Mechanization and Irrigation Engineering that let us be job creators but not job seekers.

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Special thanks go to the department of Agricultural mechanization and Irrigation Engineering Busitema University and the supervisor for the guidance towards my project proposal which has allowed me to improve on the innovation skills and practical skills.

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And lastly the Almighty God for the gift of life and guidance in my studies.

CHAPTER ONE

1.1 Background

Banana (*Musa acuminata*) / Ekitooke is a tropical herbaceous plant consisting of an under-ground root and trunk and the trunk comprises of concentric layers of the leaf sheaths and the farmers in Uganda cultivates banana plants. Since 2010, Uganda is divided into four administrative regions: Northern (yellow), Eastern (green), Central (red) and Western (blue) and one city (the capital city of Kampala)

(Government of Uganda, 2010)

The 2008/2009 census (conducted during the second season of 2008 and the first season of 2009) found that 68%, the banana crop was produced in the Western Region, followed by the Central Region (23%), the Eastern Region (8%) and the Northern Region with less than 1%. The Western Region had the highest yields (6 tones /ha) while the Central Region had the lowest ones 3.3 tones/ha). (*Morphology of Banana Plant / Improving the Understanding of Banana*, n.d.)

At the time of the census, the country was divided into 80 districts, of which 63 reported growing bananas. The districts with the highest production were all in the Western Region: Isingiro (597,000 tons from 45,000 ha), Mbarara (540,000 tons from 32,000 ha) and Bushenyi (344,000 tons from 110,000 ha).

(*Morphology of Banana Plant / Improving the Understanding of Banana*, n.d.)

For about 8-13 months after the emergence of a new banana plant, its true stem rapidly grows up through the center and emerges as a terminal inflorescence which bears fruits. Banana stem is one part of a banana tree that is rarely used / processed by the community. Usually when the banana fruit gets ready, it is cut down with its stem, because the banana plant bears its fruit once. Since most of the times the banana stems are left to rot and yet they contain useful values for the animals.



Figure 1 SHOWS BANANA STEMS

Banana stem is known to have a complete nutritional content as a substitute for animal feed. The average composition of nutrients in banana stem include: dry matter 87.7%, Ash 25.12%, Crude fat 14.23% Crude fiber 29, 40% Crude protein 3% including: amino acids, amine nitrate, glycosides, B vitamins, Nucleic acids, non-nitrogen (28.24%), extracts including carbohydrates, sugars and starches (Dayana et al., 2018)

Banana stem is one of the agricultural wastes that are not utilized; banana stem comes from banana tree which has been harvested banana fruit.

In Uganda chopping of the banana stem is done with the help of pangas. This method is tedious, slow and may cause injury to the farmers, therefore I propose to design and fabricate followed by the farmers on a wide range. But instead of these stems to decompose in the gardens in case they are not utilized in one way or the other, I intend to design and fabricate an engine banana stem chopping machine which can chop the banana stems for animal feeds which is a user friendly and cost effective to the farmers.

1.2 PROBLEM STATEMENT

- ❖ Due to scarcity of the feeds being provided to the animals especially to people dealing in rearing them, there is need to supplement with the banana stems;

Currently, Farmers in Uganda use Manual methods which include; pangas, knives, to cut banana stems in order to provide feeds to the animals. But the methods used produce feeds from the banana stems to the animals are so tedious and requires higher physical energy requirement to chop the stems and the production is low. Therefore that is why I have designed the the banana stem chopping machine.



Figure 2 MANUAL CUTTING OF BANANA STEMS

1.3 OBJECTIVES

Main objective

To design and fabricate an engine operated banana stem chopping machine for production of cattle feeds.

Specific objectives

- To design the different components of the prototype.
- To fabricate and assemble the different components of the prototype and to test the performance of the constructed prototype.
- To carry out the financial analysis of engine operated banana stem chopping machine for production of animal feeds.

1.4 Justification of the study

- The machine will help to increase quantity of chopped banana stem feeds produced.
- Save time taken during chopping.
- It will reduce human Drudgery.

1.5 Scope of the study

- ❖ Project was limited to design and fabrication of the different components of the prototype.
- ❖ Use of cheap and locally available materials on market.
- ❖ The Geographical scope was Lugazi District, Njeru municipal council

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