



FACULTY OF ENGINEERING

**DEPARTMENT OF AGRICULTURAL MECHANIZATION AND IRRIGATION
ENGINEERING**

**DESIGN AND CONSTRUCTION OF AN ANIMAL DRAWN ORGANIC MANURE
SPREADER**

BY

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**PROJECT PROPOSAL SUBMITTED IN PARTIAL FULFILMENT FOR THE AWARD OF BACHELOR DEGREE IN
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DEDICATION

I dedicate this work to Mr. Rudu Joseph and Nabukwasi Sarah and all my family members who have always guided and encouraged me plus the financial assistance offered to me during my study and have also given me support at all time may the almighty lord bless them abundantly.

ACKNOWLEDGEMENT

I thank the almighty God for the gift of life, wisdom and good health throughout this period.

Furthermore i would also like to thank my parents Mr. Rudu Joseph and Nabukwasi Sarah, my Supervisors Dr. Catherine Wandera and Mr. Wangi Mario Who really worked tirelessly to make sure that my project is completed.

DECLARATION

I **ASSIAH JOSEPH** declare that this work is original and has not been submitted for any academic award in any higher institution of learning.

Signature:

Date.....

APPROVAL

This proposal by Assiah joseph under the topic Design and construction of an animal drawn organic manure spreader has been under supervision.

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ABSTRACT

Currently organic manure is known to be the oldest manure used in agriculture up to date used by man ever since involved in farming. It consists of mainly of litter, waste products of crops mixed with animal dung and urine. Therefore, it contains all the nutrient elements present in the plant itself and returns these nutrients to the soil when it is applied to the field for the benefit of succeeding crop.

The design and fabrication of animal drawn organic manure spreader include the different components *that is to say, the* power transmission system, main axle shaft, bullock cart chassis and frame, manure box, steel wheels with rubber padding and sliding plate. A pair of bullock acts as power sources for the hauling purpose.

The animal walking speed is mainly decided to the power transmission of manure applicator, because rotor shaft rotation is directly related to the main axle shaft power is transmitted by 1:3 ratio of power reduction (main axle shaft: rotor shaft). The design and construction of the animal drawn organic manure spreader is aimed at reducing human drudgery, improve on the spreading uniformity, increase application rate when applying organic manure in the fields by the rural farmers.

LIST OF ACRONYMS

NARO	-National Agricultural Research Organization
NAADS	-National Agricultural Advisory Services
P.T.O	-Power Take Off
KSL	- Kakira Sugar Limited
SCOUL	- Sugar Cooperation of Uganda Limited
FYM	- Farm Yard Manure
FAO	- Food and Agriculture Organization

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1. CHAPTER ONE: INTRODUCTION

1.1 Overview

This section comprises of the background, problem statement, objectives, justification and the scope for the design and construction of an animal drawn organic manure spreader.

1.2 Background

In Uganda organic manure is mainly being applied through manual broadcasting by the local farmers, resulting to more labors and time per unit area with poor application uniformity and wide variation in the application rate.

The bullock-cart/tractor trailers are being used to transport the manure from the compost pit to the field and manure is stack piled in the field. The spreading of stack piled manure is performed manually with spade, which involves human drudgery.

According to Singh and Singh, 2006 research has been shown that the stack piled manure loses about 21% of its nitrogen to the atmosphere. Proper spreading and incorporation in the soil reduces the loss to only 5%.

The small and marginal farmers have a pair of bullocks instead their limited use in tillage, sowing, intercultural and transport operations about 58 days/year and high maintains cost in slack period. Hence, there is need to increase the working hours of bullocks for other agricultural operations, *viz.*, spreading of farm organic manure in the field. The existing bullock carts used for transport of manure to the field can also be modified for the organic manure spreading operation.

In recent days, organic farming is a promising solution in agricultural farming, rather than the use of chemical fertilizers. Keeping of all these facts in mind, an animal drawn organic manure applicator to be developed for uniform spreading of manure and eliminate the human drudgery involved in spreading of organic manure in the field. Utilization of bullocks for manure spreading in field will increase the additional working hours of 24-36 hour per year for two seasons and lower the maintenance cost of animals per pair per year (Singh and Singh, 2006).

All solid manure applicators discharge at varying rates depending on ground and auger or P.T.O speeds, equipment settings and manure moisture content (Koenig *et al.*, 2010). In agriculture, manure, compost, or sewage sludge are generally applied with manure applicators. Keeping in view of drudgery involved, a suitable animal drawn manure applicator is need of hour for usage.

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