BUSITEMA UNIVERSITY
Pursuing Excellence

FACULTY OF ENGINEERING

DEPARTMENT OF AGRICULTURAL MECHANIZATION AND IRRIGATION ENGINEERING

DESIGN AND FABRICATION OF A DUAL POWERED AGITATOR FOR CAKED LITTER IN A SMALL SCALE POULTRY FARM

BY

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A final year project proposal 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

ABSTRACT

Poultry farming is the process of raising domesticated birds. In Uganda today, famers use various methods of poultry keeping which some are for small scale farmers and others are for large scale farmers. Poultry is practiced by many people because it's the easier way to kick poverty therefore very many people are opting to carry out extensive poultry keeping thus some methods of rearing becomes inefficient hence prompting the use of such methods like deep litter. This system is extensively practiced.

As birds drop on the litter, it increases the level of moisture and this makes the litter to cake hence secretion of ammonia and other effects like high temperatures. Therefore, this prompts the need of agitation to cub high moisture levels and this forced the author to thick of away how to solve the problem. In this research the author used the various scientific principles, theories, equations, assumptions, procedures and soft wares such as solid edge to come with the design of the litter agitator.

The design was sequential where I began with quantifying and characterizing the litter, then sizing the components followed on with analysis of forces acting on them. Force analysis led to selection of proper materials to withstand the forces to avoid failure. Mild steel was the main materials recommended to be used because of its strength and durability. Engineering drawings of the various components were drawn before the various components were constructed and then machine parts fabricated. A fully functional prototype resulted after all the above operations.

Testing of the prototype was carried out and the figures revealed that the machine was 71% efficient. The litter agitator has a total cost of 400,000. ***UGX*** which includes all the overhead costs, cost of material, machinery and hired labor to construct the machine. The cost evaluation analysis of the project was based on the net present value method and thereafter profitability index was applied to further analyze the project viability.

DECLARATION

I MULOOKI HENRY, hereby declare to the best of my knowledge, that this final year 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.

Signature.....

MULOOKI HENRY

APPROVAL

This proposal report has been submitted to the Department of Agricultural mechanization and Irrigation Engineering for examination with approval from the following supervisors:

MR. KAVUMA CHRIS

Signature.....

Date.....

Mr. ERIAU EMANUEL.

Signature.....

Date.....

DEDICATION

This report is dedicated to my beloved parents Mr Nabeeta Nathan & Mrs Wakabi Fatina 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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I thank the almighty God for the life, wisdom, knowledge, grace, mercy, and protection He has given unto me since childhood. He is worthy of our praise and worship.

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Special thanks goes to my committed project supervisors; **MR KAVUMA CHRIS and MR ERIAU EMANUEL** for the time, guidance, and support rendered unto me during the project proposal preparations.

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LIST OF ACRONYMS

UBOS - Uganda National Bureau of Standards

NAADS – National Agricultural Advisory Service

NGOs – Non Government Originations

P.T.O – Power Take Off

U.D.I – Uniformly distributed load

BM – Bending Moment

CHAPTER ONE

This chapter presents the general information about the research design giving its background, problem statement, significance, objectives, justification and scope of the study.

1.1 Background.

Poultry farming is the process of raising domesticated birds such as chickens, ducks, turkeys and geese for the purpose of getting meat or eggs for food. **(Parkhurst., 2012)**. Poultry are farmed in great numbers with chickens being the most numerous all over the world and domestication of the chicken dates back to at least 2000 B.C. and their ancestry can be traced back to four species of wild jungle fowl from Southeast Asia. In the world, more than 50 billion chickens are raised annually as a source of food, for both their meat and their eggs. **(Xiang et al., 2014)**

In Uganda, poultry farming has been on a progressive increase for the previous years as in 2014 the poultry population was 44.7 million compared to 2011 where it was 39.3 million **(UBOS 2015)** and it's majorly practiced in the central region of Uganda in districts such as Kampala, Masaka, Wakiso, Mukono and then a few poultry farms in the western and eastern Uganda. And in Uganda, there are both model poultry and private farms.

And several efforts have been put into place to scale up poultry production in Uganda, i.e. NGOs and government organizations such as NAADS have been so influential in supporting the development and improvement of poultry farming such as the introduction of more productive breeds.

Commercially, poultry farming in Uganda is commonly practiced using deep litter system (where the earth or concrete floor is filled with either coffee husks, saw dust, wood shavings and other materials for the birds to sleep on) though there are various systems of poultry keeping such as free range and battery cage system. But the deep litter system dominants just because of its numerous merits for example; increased efficiency in poultry management, maximizes the land for farming, good for management of large flocks, maximizes use of labour and birds are protected from harsh weather.

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