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FACULTY OF ENGINEERING

DEPARTMENT OF AGRICULTURAL MECHANIZATION AND IRRIGATION ENGINEERING

DESIGN AND FABRICATION OF AMANUALLY OPERATED POULTRY FEED PELLETING MACHINE

BY

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ABSTRACT

Uganda's economy is largely agro-based and in an attempt to improve the income base, the developing technology has to meet the needs of the farmers. The poultry sub sector is crucially important in the context of agricultural growth and improvement of diets of the people in Uganda. For poultry birds to do well, well balanced poultry feed pellets should be available. Some motorised poultry feed pelletizers have been set up but have of limitations. The machines are expensive to buy, expensive to maintain, cannot be operated in times of power blackouts and also cannot be used in rural settlements where electricity supply is not in existence. Therefore, the objective of the study was to design, develop and test a manually operated poultry feed pelleting machine for small scale farmers. This will therefore help small scale farmers make their own easily digestible pellets, reduce feed loss during feeding, help farmers poultry farmers feed their birds on balanced feeds.

The design of the various machine parts was carried out by analysing forces acting on them. Force analysis led to selection of proper materials to withstand the forces to avoid failure.

Mild steel was the main material used because they it is readily available and cost effective. Engineering drawings of the various components were drawn before the various components were constructed. Then prototype assembly was done last according to the engineering drawings. A fully functional prototype resulted after all the above operations.

Testing of the prototype was carried out and the machine had a maximum pelleting efficiency of 87.4% and machine output capacity of 19.2kg/hr. Moisture content constitute the greater portion of variability in efficiency. A unit increase in moisture content resulted in an increase of about 20% in pelletizing efficiency. The adoption of the pelletizing machine by small and medium scale farmers would go a long way in helping them to produce their own feed with local contents thereby alleviating the problems associated with the sourcing of imported feeds.

DECLARATION

I **Mpeeka Mathew** do humbly declare that the data and information in this final year project report is originally organized to my best of understanding, knowledge and skills. This report has never been submitted to any university or institution for an academic award.

Signature .....

Date 26/05/2016.....

APPROVAL

This final year project report has been submitted to the Department of Agricultural Mechanization and Irrigation Engineering for examination with approval from the following supervisors

Mr. Oketcho Yoronimo

Signature.....

Date.....

26-05-2016

Ms. Nabaterega Resty

Signature.....

Date.....

ACKNOWLEDGEMENT

All glory and thanks go to God, who has granted me the gift of life and a chance to reach this moment of writing this report and I pray that HE grants me more time to live and implement this study as well as ascertaining its contribution to the case study area…Amen.

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LIST OF ACRONYMS

FAO	Food and agriculture organisation
rpm	revolutions per minute
PTO	Power take off
Kg	kilograms
N	Newton
cm	centimetre
FCR	Feed conversion ratio

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CHAPTER ONE: INTRODUCTION

1.1: Background of the study

The poultry sub sector is crucially important in the context of agricultural growth and improvement of diets of the people in Uganda(MAAIF, 2009). The sub sector is particularly important in that it is a significant source for the supply of protein and nutrition in household's nutritional intake. It is an attractive economic activity as well, especially to women and poor population. It acts as a key supplement to revenue from crops and other livestock enterprise(MAAIF, 2009).

Poultry industry in Uganda is mostly centred in rural areas with several constraints in production including: production related constraints like limited access and affordability of feed, inadequate access to improved breed, poor disease control measures, lack of knowledge and skills regarding poultry keeping and inadequate capital at all levels and marketing. As the world population increases there is need to have proteins in everyday diet of all people. It is essential therefore to increase protein production by all possible means. Poultry farming is one of the ways being emphasized in order to increase the availability of food rich in protein. Although poultry is fast developing, the yields obtained from the poultry farms are still low. The low yield has been attributed to inadequate supply of balanced poultry diets **(FAO, 2014)**. Poultry feeds can either be an organism or can be artificial using well compounded nutrient balanced feed meal. There are three forms of artificial feeds namely; mash, pellets and crumbles but pellets are more advantageous than the mash feeds(**Jahan et al. 2006**). Mash is a form of a complete feed that is finely ground and mixed so that birds cannot easily separate out ingredients. Feeding birds on mash results into high feed losses,lower feed intake compared to crumbles-pellets(**Jahan et al. 2006**). Pellet is a form of artificial feed that is formed by mechanically pressing mash feed through die openings. Crumbles are formed by crushing pellets to small granules.

Electrical pelleting machines have been set up but they are expensive to buy, require proper care, and can only be used in areas with electricity. Therefore, the objective of this study was to design, develop and test a manually operated poultry feed pelleting machine for small scale farmers. This will therefore help farmers produce well balanced palatable pellets, reduce feed loss during feeding process and also help rural farmers produce pellets without using electricity.

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