



**BUSITEMA
UNIVERSITY**
Pursuing Excellence

FACULTY OF ENGINEERING

**DEPARTMENT OF AGRICULTURAL MECHANIZATION AND
IRRIGATION ENGINEERING**

**DESIGN AND CONSTRUCTION OF AN IMPROVED HAND DRAWN
PLANTER FOR MAIZE**

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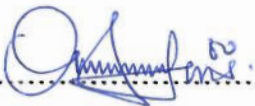


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DECLARATION

I OKELLO FELIX declare that the work in this report is original except where indicated by special reference in the text and no part of the report has been submitted to any other university for examination and degree award. Any views expressed in this report are those of the author and in no way represent those of Busitema University.

Signature..........

Date.....02/06/2017.....



DEDICATION

This report is prepared in loving memory of my parents Mr. OMAL ZAKEO OOLA and Mrs. LAMUNU FLORENCE ANGEE in appreciation for their selfless care and utmost support provided to me, 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 what I am today.

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May God Almighty Bless You

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ABSTRACT

Maize has been in the diet of Ugandans for centuries, it is the most highly cultivated crop, with statistics showing that maize was cultivated by about 86% of the 4.2 million agricultural households in Uganda by 2007. It is very nutritious especially Quality Protein Maize (QPM) which has higher levels of essential amino acids and therefore is very good for children and is the primary food source in institutions such as schools, prisons, military and the police. The government of Uganda has prioritized maize as one of the 10 agricultural crops within the Rural Development and National Zoning Strategy. This positions maize to play an increasingly significant role in the poverty alleviation agenda of the country.

Farmers are slowly adopting the use of improved technologies in planting, for instance jab planters and row planters which are human drawn. These technologies especially the manual row planters are still faced with challenges such as continuous planting at a set intra row spacing, allowing dropping of seeds on headlands, point rows, water ways, terraces and other non-productive parts of the field. Besides, the operator (farmer) need to carry or lift the planter at the end of each row and place on the next row, which is very tedious and reduces on the effective planting time with increased planting costs.

This work focused on the design and construction of an affordable manually operated single row improved maize planter. The design is to improve on planter performance by introducing seed planting control to optimize input. The benefits of this particular design includes; reduced agricultural input, optimum crop production; eradicate seeds wastage in between rows; ensures capacity utilization of available farm land; Saves tremendous amount of time during farming.

Performance test results showed that the control and metering efficiency is 98.9% and 75% respectively. The ergonomic gives the conclusion that the human drudgery can be saved a lot by using control system actuated at the handle. No investment cost difference found between the improved planter and non-improved one. Hence, it is advantageous to opt for the improved planter. The same design can also be used on animal draft implements.

CHAPTER ONE

1 INTRODUCTION

1.1 Background

Maize is widely cultivated throughout the world, with the United States producing 40% of the world's harvest; other leading countries are China, Brazil, Mexico, Indonesia, India, France and Argentina. According to FAO annual reports, global production was 817 million tons in 2009, more than rice (678 million tons) or wheat (682 million tons); in 2009, over 159million hectares of maize were planted worldwide, with a yield of over 5 tons/ha. In industrialized countries, maize is largely used as livestock feed and as a raw material for industrial products. Maize is an important source of carbohydrate, protein, iron, vitamin B, and minerals. Africans consume maize as a wide variety of porridges as well as a highly preferred starch used in the fermentation of local non formal alcoholic brews and beer. Green maize (fresh on the cob) is eaten parched, baked, roasted or boiled; playing an important role in filling the hunger gap after the dry season.

Maize has been in the diet of Ugandans for centuries. It started as a subsistence crop and has gradually become a more important commercial crop. Maize is the most highly cultivated crop, with statistics from the Uganda National Housing Survey (UNHS) of 2005/6 showing that maize was cultivated by about 86% of the 4.2 million agricultural households in Uganda(UBOS/MAAIF 2007) Furthermore Maize is an important staple food for the urban poor, it is very nutritious especially Quality Protein Maize (QPM) locally known as Nalongo which has higher levels of essential amino acids and therefore is very good for children and is the primary food source in institutions such as schools, prisons, military and the police (UNDP Value Chain Report, 2010). To underline the importance of this crop, the government of Uganda has prioritized maize as one of the 10 agricultural crops within the Rural Development and National Zoning Strategy. This positions maize to play an increasingly significant role in the poverty alleviation agenda of the country (UBOS/MAAIF 2007)

In small scale farming, the use of hoes for crop cultivation is still prevalent due to poverty within the region. Research indicates that most growers could improve their yields by just improving on

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