



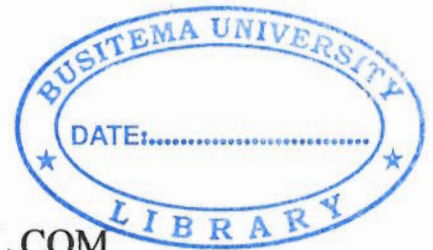
**BUSITEMA  
UNIVERSITY**  
*Pursuing Excellence*

FACULTY OF ENGINEERING DEPARTMENT OF AGRO-  
PROCESSING ENGINEERING  
DEVELOPMENT OF GRAIN MOISTURE AND TEMPERATURE  
PROBE

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*A Final Year Project Report Submitted In Partial Fulfilment Of The Requirements For  
The Award Of The Bsc. In Agro- Processing Engineering Of Busitema University.*

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### Abstract

Grains are the main source of food to millions of people living across the world today. They are grown by large population on both small and large scale this implies that output production capacity is much so this would result into storage of grains to prolong their quality and maximize the quantity. Grains handling during post value require transportation, drying, storage however grains managers tend to store grains with insufficient moisture content but even if they store at the right moisture content there is always moisture migration in the store due environment temperature differences .moisture and temperature are the critical factors that activitates a friendly environment for development of insects, moulds and others.

The grain losses in the stores is approximated to be 13% out of 30% the total post harvest losses encountered in The handling of the grains. The existing Primary methods of moisture and temperature determination using dry oven and Karl Fischer methods are time consuming. Destructive in the way that sample used cannot be altered to its initial state, and be used for its intended purpose, require use of chemical reagents that are expensive to buy and disposal

The purpose of this project was to make a friendly and time saving and non destructive device that can detect both moisture and temperature of grains with a minimum skills to operate. So the development of grain moisture and temperature probe would require. Identification of suitable components, fabrication of the probe , also coding of the probe, and testing of the prototype of the project.

**Declaration**

I **Wambazu Paul** declare that this project report is my original work and has not been presented in this or any other institution of learning for the award of a degree.

Registration number BU/UP /2015/178

Signature .....  .....

Date..... 17/05/2019 .....



**Approval**

This project proposal has been submitted to the department of Agro-Processing Engineering of Busitema University with approval of my University Supervisor.

MR KILEMA GEORGE

Signature.....

Date.....

### **Dedication**

My momS Nabukonde Monica, Mary Wodadad and are undoubtedly a great gift from God. Thank you for laying a firm foundation for me and showing me the right direction to take, you are my first class mentors as the short saying states "charity begins from home".

Dearly brothers Weyombo anthony and my sister Makosya scholar, for your encouragements and supports up to where I have reached

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I indeed can't forget to appreciate my colleagues, the Collaborative BSc. Agro processing engineering class of the year 2015, Busitema University, who are often gave in help when I needed it.there for me whenever I need any help.

Above all Almighty God,for the gift of life ,protection and provision whenever am defeated may you continue blessing me.

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## CHAPTER ONE INTRODUCTION

### 1.1 introduction

The chapter presents the introduction to the study. This chapter consist of the back ground to the project the problem statement objectives significance scope for the study.

### 1.2 background

Africa is the centre of origin of grains producing area notably sorghum maize millet and African rice. These African cereals are staple food for millions of people in the semi arid regions of the world particularly Africa (Taylor, 2008)

The cereal grains account for 70% of the world wide food production (shwery, 2005). The government of Uganda consider grain sector to be stragic point for economic transformation of country owing the fact that grain sector creates employment opportunities for Ugandans through entire value chain of the grains (kyambade,2015) consequently the food produced in one harvest period must be stored for gradual consumption until the next harvest and also seed should be stored to be planted for the next season.

Grain moisture and temperature are considered to be principal factors for maintaining the quality and quantity of grains during storage. In Africa countries like Uganda a large proportion of the grains are harvested and stored under hot and humid conditions and most farmers are ignorant about how these conditions affect the quality of grains(Weinberg et al, 2008) subsequently the grains that are stored with relative moisture and warm results into rapid deterioration of grains and promote the growth of molds insects bacteria(Norton 1999)

When storage environment are not properly maintained quality and economic losses can occur from such results causes mould growth and insect damage which are usually moisture troublesome problems to control in the modern structures



The estimated cost of the grain loss from the store due to insects bacteria micro organism in the developing countries like Uganda every year range from \$ 500million to \$ 1 billion (compbell et al ., 2004).

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