



**BUSITEMA  
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**EVALUATING AND CLASSING OF UGANDA'S COTTON LINT QUALITY FROM  
DIFFERENT GROWING SEASONS.**

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**A final year report submitted to the department of textile and ginning engineering in  
partial fulfilment of the award of a bachelor's degree in textile engineering**

**DECLARATION**

I TUKAHIGWA OZIAS declare that this research is my original work and it has never been presented to any academic institution for any reward.

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**APPROVAL**

This is to certify that this research under the title **“EVALUATING AND CLASSING OF UGANDA’S COTTON LINT QUALITY FROM DIFFERENT GROWING SEASONS.”** was made under supervision.

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## ACRONYMNS

AHC Agglomerative Hierarchical Clustering.

CDO Cotton Development Organization

EA1 sample 1 from Eastern, season A

EB2 sample 2 from East, season B

HVI High Volume Instrument

ICAC International Cotton Advisory Committee

NA1 sample 1 from North, season A

NB2 sample 2 from North, season B

PCA Principle Component Analysis

WA1 sample 1 from West, season A

WB2 sample 2 from West, season B

## ABSTRACT.

Cotton is a white fluffy substance that grow around the seeds of cotton plant. Cotton classification begun well back in 1780s with hand classing basing only on four parameters. However, nowadays at least 14 parameters are used to characterize and class cotton quality

In this research, an Uster HIV 1000 was used to characterize cotton up to 14 parameters. Data from HIV1000 was printed out using a computer accessory. The data was analyzed using Principal component analysis (PCA), Agglomerative Hierarchical Clustering (AHC) and descriptive statistics. The most significant variables, the variations in quality according to seasons and finally the evaluation and classing of the Ugandan cotton lint according to quality was successfully done using Ugandan Standards and their International equivalent Standards.

In my conclusion, most cotton from North and East was similar as indicated by both PCA and AHC analysis tools indicating a similarity in seasonal changes for the two regions compared to West. Generally, there was no distinct change in quality due to change in seasons. Also, Uganda's cotton quality like in previous research was found to ranges from middling to good middling (International standards) that is UCOP to UCON in Ugandan standards.

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## CHAPTER ONE

### 1.0 INTRODUCTION

#### 1.1 BACKGROUND OF THE STUDY

Cotton is a soft, fluffy staple fiber that grows in a boll, or protective case, around the seeds of the cotton plants (Characteristics & Fabric, n.d.)

#### **Evolution Cotton species**

Cotton breeds names are derived from a scientific word *Gossypium* which is its genus a biological term used in classification. 8 *Gossypium* diploid species genomes A through G and K species existed 5-10 million years ago and all polyploid species 1-2 million years ago as a consequence of transgenic dispersal of diploid species A. Subsequent hybridization with diploid D genome led to evolution of three modern lineages, 2 of which are commercially important. These are *Gossypium hirsutum* and *Gossypium barbadense* tetraploids which are originally grown in America (Khadi & Venoor, 2010). Domestication of *Gossypium* brought about further two species that is *Gossypium arboreum* and *Gossypium herbaceum* diploids originally from Asia and Africa (Wendel, Brubaker, Alvarez, Cronn, & Stewart, 2009)

#### **Cotton growing.**

Cotton is the leading fiber grown in the world i.e over 50 countries grow it (Report, 2006). According to International Cotton Advisory Committee (ICAC), World production as per 2017/2018 on October 27, 2017 was 25.57 million metric tons with India leading in total production at 6.03 million metric tons. China is leading producer (1265kg/ha) followed by USA (985kg/ha). India is the leading cultivator of cotton followed by China, USA and Pakistan. (Khadi & Venoor, 2010)

The major growing areas of India are north zone central zone and south zone which contributes to 95% of cotton area and production. India is the only country that grows all the species with 45%, 30% and 24.7% area covered by hybrids, upland cotton and diploid species respectively and 0.3% for *Gossypium barbadense* (Singh, 2011).

#### **Cotton in Uganda**

It was introduced in Uganda in 1903 by the British ("cotton from uganda," n.d.) and species majorly cultivated is *Gossypium hirsutum* in areas of Northern, West Nile, Eastern, Western and Southern regions. Planting begins in April-June for northern areas with one rainy season while in southern areas with two seasons, planting begins in June-July period. In 1970, Uganda produced 470,000 bales which contributed to 40% of foreign exchange earnings in that year. Production later dropped to 20,000 due to instability in the country. With introduction of Cotton Development Organization (CDO), yields have improved and currently according to <https://eagle.co.ug/>, production was about 150,000 bales (2016/17 season) with 200,000-250,000

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