Effect of Maize Milling on Household Income in Kyembogo Village, Bussoro Sub-County, Kabarole District

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Declaration

I, Bukirwa Dimintiria, hereby declare that this report is my own work and has never been submitted to any institution for any academic award.

Sign .....

Date 12th/11/2025

Approval

This is to certify that BUKRWA DIMINTIRIA had a month of field attachement training at Rwebitaba Zonal Agricultural Research and Development Institute and this is a true record of what she was able to be involved in and do under our supervision.

Agency Supervisor

Signature

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Date.....14. 10. 2024.....

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Signature.....

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Date..02/10/2024.....

Dedication

This research is dedicated to my family and friends, whose unwavering support and encouragement have been a constant source of inspiration, and to my Faculty Mentor Mr. Okiria Aisu Latif for academic guidance.

Acknowledgement

I would like to express my deepest gratitude to all those who contributed to the success of this research. Without their invaluable support, this study would not have been possible.

First and foremost, I extend my sincere thanks to my Faculty Mentor, Mr. Okiria Aisu Latif for the continuous guidance, expert advice, and constructive feedback throughout this project. Your insights have been pivotal in shaping this research and deepening my understanding of the subject matter.

I am also grateful to the farmers of Kyembogo Village, who generously shared their time, experiences, and data for this study. Your willingness to participate in interviews and providing detailed information about your livelihoods has been essential in understanding the real-world effect of maize milling on your income.

Special thanks to the local leaders and community members of Kyembogo Village for their support in facilitating my access to participants and their encouragement throughout the research process. Your cooperation and hospitality made my fieldwork both productive and memorable.

I would like to acknowledge the contribution of Rwebitaba ZARDI whose resources and support have been vital for the completion of this project. Additionally, I appreciate the assistance of the research assistants and data collectors who helped with the survey and data analysis.

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List of Acronyms

NGO: Non-Governmental Organizations

PAR: Participatory Action Research

FCDs: focus group discussion

NFA: National Food Authority

FAO: Food and Agriculture Organization

AGRA: Alliance for a Green Revolution in Africa

R&D: Research and Development

EAC: East African Community

Abstract

This Participatory Action Research was conducted to find out the effect of maize milling on household income in Kyembogo Village, Busoro Sub-County, Kabarole District. Maize (*Zea mays* L.) is a staple crop in the region, and its milling process is essential for value addition, yet its direct influence on farmers' economic welfare remains understudied. This research used a mixed-methods approach, combining both quantitative surveys and qualitative interviews with 45 maize farmers. The research objectives were to; find out availability of maize milling services in Kyembogo village, determine availability of processed maize products in Kyembogo village, find out the income earned from maize milling services, and identify challenges faced by farmers during maize milling. Findings revealed majority (44%) of the farmers in Kyembogo Village were involved in maize farming for a period more than 6 years, while the least (2%) of the farmers have been engaged in maize farming for less than a year. Similarly, majority of respondents (87%) reported to be engaged in maize milling while the least number (13%) of respondents reported not to take part in maize milling operations. Also, majority (56%) of respondents reported introduction of milling services to positively boost on household income streams, while none of the respondents' reported introduction of milling services to decrease household income. However, challenges such as high milling fees, limited milling capacity, and seasonal fluctuations in maize production reduce incomes realized after milling. The study concluded that maize milling positively contributed to the income levels and household welfare of farmers in Kyembogo Village by providing access to higher market prices, improving household standards of living, and enabling investment in other economic activities. Therefore, improving milling infrastructure to enhance the economic stability of maize farmers in Kyembogo Village is necessary so as to contribute to sustainable livelihoods and rural development in the region.

CHAPTER ONE

GENERAL INTRODUCTION

1.0 Introduction

This Chapter presents the background of the study, vision statement, purpose of the study, objectives, research questions, scope, and significance of the study.

1.1 Background of the study

Maize (*Zea mays* L.), also called corn, is believed to have originated in central Mexico 7000 years ago from a wild grass, and Native Americans transformed maize into a better source of food. Maize contains approximately 72% starch, 10% protein, and 4% fat, supplying an energy density of 365 Kcal/100 g and is grown throughout the world, with the United States, China, and Brazil being the top three maize-producing countries in the world, producing approximately 563 of the 717 million metric tons/year. Maize can be processed into a variety of food and industrial products, including starch, sweeteners, oil, beverages, glue, industrial alcohol, and fuel ethanol. In the last 10 years, the use of maize for fuel production significantly increased, accounting for approximately 40% of the maize production in the United States (Ranum, 2014).

In Africa alone, more than 300 million people depend on maize as their main food crop. In addition, maize is also very important as feed for farm animals. Currently, approximately 1 billion tons of maize are grown in more than 170 countries on about 180 million hectares of land. 90% of the world's production is yellow maize, but in Africa, 90% of the total maize production is white maize. Maize production in Africa is very low: while the average yield worldwide is approximately 5.5 tons/hectare/year, production in Africa stagnates at around 2 tons/hectare/year (Kato, 2023).

The EAC maize context is partially disconnected from global trends. Kenya, in particular, is a voracious consumer. Unable to satisfy its demand with domestic supply, the country imported the second highest volume of maize in Sub-Saharan Africa behind Zimbabwe in the period from 2004 to 2013 (Moti, 2022). Both Uganda and Rwanda have sizeable market share in maize flour exports. Consumers in the EAC are sensitive to price considerations, which mean that transportation costs can impair competitiveness. As a result, trade of maize flour is concentrated in countries in close

geographic proximity. Uganda exports its surplus maize flour to the Democratic Republic of Congo (DRC) and South Sudan, while Rwanda, which is a relatively minor player in the regional market and not reliant on Kenyan consumers, exports low quality flour to the DRC and Burundi (Mugabi, 2018).

In Uganda, maize is both a staple food and a cash crop since it plays a dual role in providing food security and income for farmers (Ajambo, 2017). Production has increased over the years, reaching approximately 4.55 million metric tons in 2020, up from 1.17 million metric tons in 2001. This growth is attributed to the adoption of improved maize varieties and favorable weather conditions that allow for two growing seasons annually. Maize also contributes to Uganda's export earnings, with 2023 exports totaling $89.06 million, primarily to neighboring countries. Maize is a fundamental crop in Uganda, contributing significantly to the food security and income of rural farmers (Kpodo, 2024). Given the above potential, this study was necessary to analyze the effect of maize milling on maize farmers income levels and overall welfare of households

Western Uganda is a significant maize-producing region, benefiting from fertile soils and favorable climate. The region contributes substantially to the national maize output, supporting both subsistence and commercial farming. Maize serves as a key food source and income generator for households in this area. In Kabarole District, maize is among the major crops cultivated, alongside bananas, beans, and cassava. It is primarily grown in sub-counties such as Bukuuku, Ruteete, Kabende, and Kasenda. Maize farming in Kabarole supports food security and provides income for local farmers. In Kyembogo Village, maize is the main agricultural crop grown in the region, often because it is essential for food security, economic stability, and trade. This crops typically form the backbone of agriculture and it is widely cultivated due to their high demand. Milling of maize into flour is a key post-harvest activity that can influence the economic returns for farmers (Kato, 2023).

1.2 Vision statement

A prosperous Kyembogo Village empowered through sustainable maize milling by 2026

1.3 Purpose of the study.

The purpose of the study was to evaluate the effect of maize milling on income levels of maize farmers in Kyembogo Village, Bussoro Sub-County, Kabarole District.

1.4 Research Objectives

i. To find out availability of maize milling services in Kyembogo village

ii. To determine availability of processed maize products in Kyembogo village

iii. To find out the income earned from maize milling services in Kyembogo village

iv. To identify challenges faced by farmers during maize milling

1.5 Research questions

i. What is the distance of the nearest maize milling machine to you?

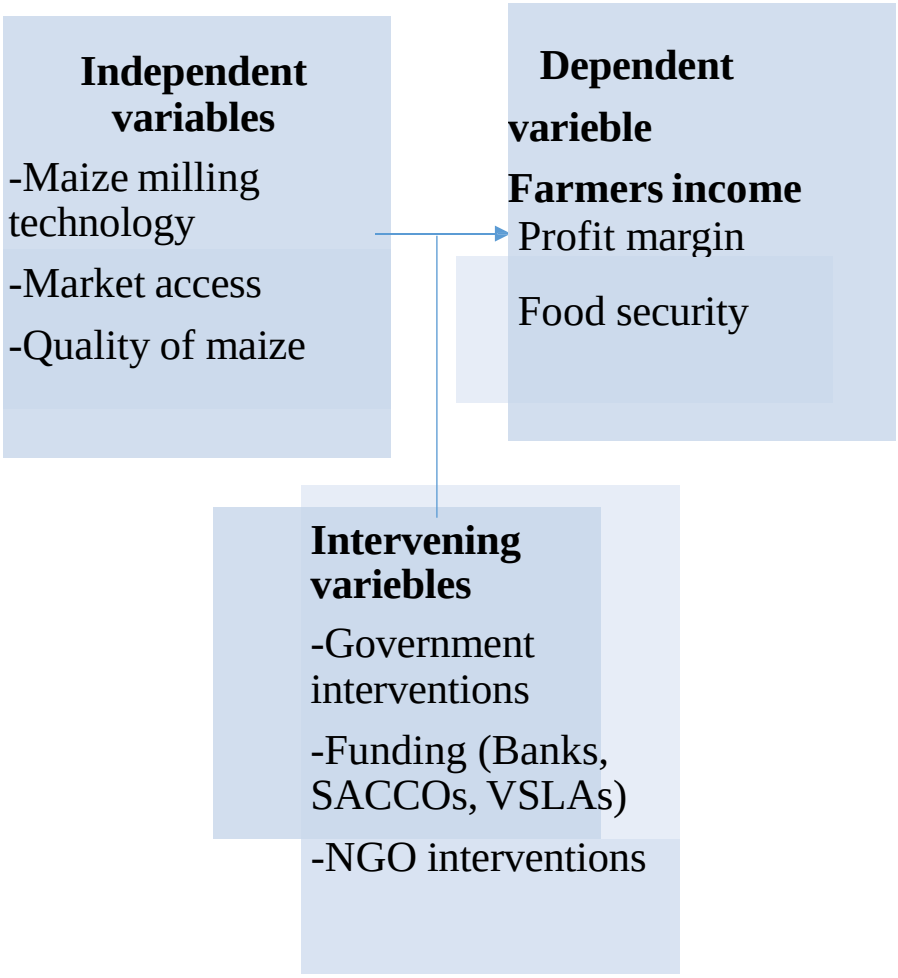
ii. Do you have market for processed maize flour?

iii. How much monthly income do you earn from maize milling activities?

iv. What challenges do you face during milling?

1.6 The conceptual framework

This conceptual framework presents interrelationships among independent variables, dependent variables, and intervening variables of the study. The framework shown below illustrated the relationships between various parameters of maize milling (considered as independent variables) and their influence on the dependent variable, that was farmers income. This model aimed to analyze and understand how these factors interacted and influenced maize farmers income levels in Kyembogo village. Farmer's income as dependent variable was quantified in terms of profit margin and food security, and these were directly influenced by maize milling technology, market access and quality of maize



Source: ***Authors' own editing***

1.7 Scope of the study

This includes content scope, geographical scope, demographic, and time scope of the research study

1.7.1 Content Scope

The study evaluated effect of maize milling on maize farmers' income levels in Kyembogo Village, Bussoro Sub-County, Kabarole District, particularly focusing on access to maize milling services, access to local and regional markets, contributions of maize milling to Household income and challenges faced by farmers during maize milling

1.7.2 Geographic Scope

This research was conducted at Kyembogo village situated within Busoro Sub-County, Kabarole District in Uganda.

1.7.3 Time Scope

The study was conducted in the period between October 2023 to May 2025. The process of data collection and analysis was done in a period of one month between September to October 2023

1.8 Significance of the Study

This research will provide valuable information on maize milling and household income in Kyembogo village and a picture to Kabarole district. It will also help inform agricultural decisions by policymakers, agricultural extension service providers, and local farmers in entire Kabarole district. Similarly, the study also suggests strategies to enhance milling practices, improve farmers' income, and boost the overall economic development of Kyembogo Village

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter presents related literature to topic of study and conceptual framework of the study

2.1 Background of the study

Since its domestication some 9,000 years ago, maize (*Zea mays* L.) has played an increasing and diverse role in global agri-food systems. Global maize production has surged in the past few decades, propelled by rising demand and a combination of technological advances, yield increases and area expansion (Moti, 2022). The global maize area (for dry grain) amounts to 197 M ha, including substantive areas in sub-Saharan Africa (SSA), Asia and Latin America. It is an established and important human food crop in a number of countries, especially in SSA, Latin America, and a few countries in Asia, where maize consumption contributes over 20% of food calories. Maize is already the leading cereal in terms of production volume and is set to become the most widely grown and traded crop in the coming decade. It is a versatile multi-purpose crop, primarily used as a feed globally, but also is important as a food crop, especially in sub-Saharan Africa and Latin America (Philip, 2003)

2.2 Maize milling statistics in Uganda

Maize is the most important cereal crop in Uganda providing over 40% of the calories consumed in both rural and urban areas (Moti, 2022). The crop has increasingly become a staple food in many parts of the country. Small scale farmers who constitute the bulk (80%) of the rural poor also account for the largest share of maize production. It is grown in every part of the country and a direct source of livelihood to over 2 million households, over 1,000 traders/merchants and over 600 millers. Increasingly, maize has become a major non-traditional export cash crop particularly benefiting smallholder farmers. Maize production statistics based on district returns to UBOS show a steady increase overtime from 1.17 million metric tons (MT) in 2001 to about 2.55 million MT in 2011 and 4.55 million MT in 2020. This is attributed to a steady increase in acreage due to expansion of maize production, increased use of improved seed, and use of fertilizers especially by commercial farmers, (Kato, 2023)

In Uganda, particularly in rural areas, Maize milling infrastructure has been a significant barrier to value addition. Mugabi, (2018) found that in rural Uganda, access to local milling facilities was limited, and farmers frequently had to travel long distances to access mills, incurring additional transportation costs. This means that even when milling is available, the costs and time involved are prohibitive. Similarly, Uganda National Bureau of Standards (UNBS) has been sensitizing and building capacity of maize millers, Processors and dealers in different parts of the country over the last one (1) year to ensure that they adhere to the Maize and Maize Flour Quality Standards by obtaining UNBS Certification (Q-Mark) before placing them on the market (Muyanja, 2020).

2.3 Maize value addition Western Uganda

Western Uganda is a significant maize-producing region, benefiting from fertile soils and favorable climate. The region contributes substantially to the national maize output, supporting both subsistence and commercial farming. Maize serves as a key food source and income generator for households in this area (Dick, 2022). In Kabarole District, maize is among the major crops cultivated, alongside bananas, beans, and cassava. It is primarily grown in sub-counties such as Bukuuku, Ruteete, Kabende, and Kasenda. Maize farming in Kabarole supports food security and provides income for local farmers. Maize can be processed into many products for human consumption, including maize grits, maize/corn flour, maize/corn meal, beverage alcohol, corn germ oil, etc., among which the maize flour and maize grits are the most common products made from maize. A commercial maize flour milling plant could make human food, industrial starch or animal feeds since maize is a staple food in Uganda, the market for maize flour or maize grits is readily available (Bedadi, 2024).

2.4 Benefits of maize value addition

The contribution of maize milling to farmers' well-being extends beyond income generation. Musinguzi, (2016) found that maize milling plays an essential role in food security in rural areas, and milling provides a way to store maize for longer periods, which helps farmers avoid post-harvest losses and provides a more stable food supply for families. Similarly, Turgendat, (2017) noted that farmers who process their maize have access to more nutritious maize flour, which contributes to improved nutrition for their families. Additionally, Nsubuga, (2019) found that access to milling operations in rural areas creates local employment opportunities, which improves the well-being of not only the farmers but also the broader community.

Access to local and regional markets is a critical factor in improving farmers' income levels. Mugisha et al. (2020) emphasized that maize milling helps farmers transition from selling raw maize to selling processed products such as maize flour, which has a higher demand and price in local and regional markets. Farmers who have access to milling facilities can tap into broader markets, including urban centers, where processed maize products are in higher demand. In Uganda, Chirwa & Kadiyala, (2017) observed that local milling helped smallholder farmers by increasing the marketability of their products, enabling them to sell at better prices. Similarly, Kendall et al. (2020) found that farmers with access to local mills had more control over pricing and were better positioned to negotiate with buyers, thus improving their bargaining power. Findings by Okello et al. (2017) also indicated that processed maize products had greater shelf-life and were less prone to market price fluctuations compared to raw maize.

2.5 Barriers and solutions to access of maize milling services

Maize milling in rural Uganda faces several challenges that limit its full potential to improve farmers' incomes. Andre, (2017) identified high milling fees and limited access to efficient milling technologies as major challenges faced by farmers, while Jordan, (2022) reported that in many rural areas, the existing mills are either outdated or inefficient, leading to high operational costs and significant maize losses during processing. These inefficiencies in milling operations can significantly reduce the profitability of farmers. In Kyembogo village, these challenges are more pronounced since electricity infrastructure is unreliable. Midamba, (2022) recommended government subsidies or low-interest loans to support farmers' access modern milling equipment and also suggested creation of farmer cooperatives to help reduce milling costs by pooling resources to invest efficient mills. He further emphasized local governments and NGOs to provide training for farmers on how to optimize milling operations.

2.6 Effect of maize milling on household income

A study by Midamba, (2022) emphasized that regions with limited access to milling facilities often face barriers to improving their livelihoods through income from maize value addition. In contrast, those who have access to functional mills experience increased profitability and better financial stability. The presence of local mills can help reduce transportation costs and improve product quality, leading to better prices in both local and regional markets. Also, Tugendhat, (2017) found that local milling allows farmers to create value-added products, which increases their income

levels. However, the overall impact on income depends on the cost of milling, the efficiency of the milling operations, and the availability of markets.

2.7 Gap synthesis

Despite the recognized importance of maize as a staple crop and the growing role of maize milling in enhancing food security and household incomes, there remains a critical gap in understanding the localized challenges and opportunities surrounding maize value addition in rural Ugandan settings, particularly at the village level such as Kyembogo. While existing literature highlights national trends in maize production, benefits of milling, and general infrastructural constraints, limited empirical research has been conducted to assess how access to and utilization of maize milling services specifically affect the income levels of smallholder farmers in rural communities. Moreover, there is insufficient data on how barriers such as high milling costs, inefficient technology, and unreliable infrastructure interact with socio-economic factors to influence the effectiveness of maize value addition in transforming farmer livelihoods. This study, therefore, was to determine the effect of maize milling on income levels of maize farmers in Kyembogo village, Kabarole District.

CHAPTER THREE

METHODOLOGY

3.0 Introduction

This chapter presents the study area, research design, study population, sampling technique, data collection methods, data analysis, ethical considerations, limitations, and delimitations

3.1 Study area

The study was conducted in kyembogo village Busoro subcounty Kabarole district. Kabarole district is bordered by Ntoroko district to the North, Bunyangabo district to the South, Kyenjojo district to the East and Bundibugyo district to the West. Coordinates: 00 36N, 30 18E. And elevation 1300-3800 meters above sea level above. Agriculture is the main economic activity and the main crops grown include maize, potatoes, beans, groundnuts, millet, and bananas

3.2 Research Design

The research adopted a cross-sectional survey design, which allowed for a comprehensive assessment of maize milling activities on the income of farmers in Kyembogo village. This design was chosen because it facilitates the collection of data from a large group of participants at a single point in time, providing a snapshot of the current situation. Descriptive research was particularly useful for understanding the nature of the milling process, income levels of farmers, benefits and challenges related to maize milling.

3.3 Study Population

The target population for this study comprised maize farmers in Kyembogo Village, who have either direct or indirect access to maize milling services. The study specifically targeted farmers who have been using maize mills for processing their harvested maize, as this is central to understanding the effect of maize milling on their income.

3.4 Sampling technique and sample size

The researchers used a sample size of 45 respondents for the whole study. This was dependent on having a good representative sample of farmers engaged in maize milling in Kyembogo village.

The study used purposive sampling to come up with the study population that was majorly targeted by the researchers, and thereafter simple random sampling to select the 45 participants. Gender considerations were also observed throughout the entire sampling process. Simple random sampling was applied since all the study population were engaged in potato farming. The sample largely included maize farmers who add value to their maize through maize milling

3.5 Data types and Sources

Data was collected using seral types from different sources

3.5.1 Primary Data

The primary data was collected directly from the field using tools like questionnaires, interview guides, observation checklists, and focus group discussion guides.

3.5.2 Secondary Data

Secondary Data was extracted from existing literature like internet and journals with this data, document review was done to answer the research questions.

3.6 Data collection methods

To gather both qualitative and quantitative data, a mixed-methods approach was used. The methods included:

3.6.1 Questionnaire survey

A set of pre-designed questionnaires (appendix 1) were used to collect quantitative data on the farmers' demographic characteristics, maize production, and income levels before and after adopting maize milling. The interviews also included questions about the frequency of milling, costs incurred, and perceived economic benefits.

3.6.2 Focus Group Discussions (FGDs)

FGDs were held with selected farmers from each group (owners of milling machines and those who use milling services). These discussions aimed to explore in-depth opinions, challenges, and suggestions regarding maize milling's effect on income. The focus group helped capture qualitative data on the broader social and economic factors affecting the farmers' livelihoods.

3.6.3 Field Observations

an observation guide helped to observe the milling process in practice, including the types of milling equipment used and the operational conditions of milling businesses. Observations helped complement data from the interviews by providing context for how maize milling is integrated into the farmers' economic activities. (Appendix 2)

3.6.4 Interviewing

an interview guide (appendix 3) was used to interview key stakeholders, including local farmers, mill operators, and agricultural extension officers, to gain insights into milling practices and their perceived impact on farmers' income.

3.7 Research procedure

The study commenced by acquiring an introductory letter from the Faculty of Technology for Rural Transformation of African Rural University to the research station (Rwebitaba ZaRDI), after getting acceptance letter from the ZaRDI, I was introduced to the local authorities of the research area. I sought for permission from the participants to carry out a joint research study with them Community Action Planning (CAP) was conducted to obtain the topic, research concept note was developed and presented to the faculty, and later approved, afterwards, a research proposal was developed, finally, data collection tools were developed and got clearance from faculty mentor to collect data

3.8 Data Analysis

Qualitative data from FGDs and field observations was analyzed thematically. Thematic analysis involved identifying common themes and patterns related to the farmers' experiences with maize

milling and its perceived impact on income. Key themes included: economic benefits, challenges related to milling operations and suggestions for improving milling services and access to milling technology. Quantitative data collected through structured interviews and questionnaires was analyzed using Statistical Package for Social Scientists (SPSS) computer software version 12 (SPSS 2015) and presented as tables, percentages, histograms, bar charts and pie charts. NVivo software was used for qualitative analysis.

3.9 Ethical Considerations

Ethical standards were strictly adhered to throughout the research process to ensure the rights and privacy of participants. Key ethical considerations included: Providing participants with an informed consent form that outlined the study's purpose, procedures, and their right to withdraw at any time without consequence; keeping confidentiality of participants' information and voluntary participation

3.10 Limitations of the study

During the study, the research team encountered some challenges which included: adverse weather conditions, inadequate funds, inaccurate information from farmers. The researchers addressed these challenges in the following ways: wearing heavy clothes and umbrellas, improvising, and using available resources and verifying the information with respondents by asking additional probing questions, respectively.

3.11 Dissemination of research findings

Research findings were disseminated through presentations during university validation workshop, and during stakeholder meetings. A final report will be shared with relevant stakeholders, including local government officials and university community. The research findings will also be published in form of research articles and conference papers.

CHAPTER FOUR

DATA ANALYSIS, INTERPRETATION AND DISCUSSION

4.0 Introduction

This chapter presents the findings from the data collected during the study on the effect of maize milling on farmers' income in Kyembogo Village. The results are organized according to the research objectives and the analysis of both qualitative and quantitative data. The chapter also includes a discussion of the findings in relation to existing literature.

4.1 Demographic Characteristics of Respondents

The demographic profile of the 45 farmers who participated in the study is presented below. This profile includes information on the respondents' gender, age, educational background, and farming experience.

4.1.1 Age distribution of the respondents

The study represented a fairly wide range of participants, with the majority being in 30-39 age group, which comprises 38% of the sample (17 respondents). This indicated that a significant portion of the respondents are within their prime working years, which influences their engagement with maize milling. The least number (2%) of the respondents are aged 60 and above, the low representation of the elderly farmers was due to their deteriorating health and/or a general disengagement from physically demanding activities like maize milling (Table 1).

4.1.2 Gender Distribution of Respondents

The majority (69%) of respondents were female, while the lowest (31%) of respondents were male. This finding confirmed the key role women play in maize milling activities within the community. The gender disparity was attributed to societal roles or access to resources, where women are more directly involved in agricultural production and related income-generating activities in this area (Table 1).

4.1.3 Education Level of Respondents

The majority of respondents (44%) have attained primary education, while the least (9%) of respondents have a higher education qualification. This indicated that a substantial portion of farmers possess basic education, this positively affects their understanding of modern milling technologies and farming practices (Table 1).

Table 1: Demographic characteristics of respondents

Demographic information		
Age	**Frequency**	**Percentage (%)**
Under 19	6	13
20-29	7	16
30-39	17	38
40-49	8	18
50-59	6	13
Above 60	1	2
Total	**45**	**100**
Gender	**Frequency**	**Percentage (%)**
Male	14	31
Female	31	69
Total	**45**	**100**
Highest education level	**Frequency**	**Percentage (%)**
No formal education	7	16
Primary school	20	44
Secondary school	9	20
Post-secondary	5	11
Higher education	4	9
Total	**45**	**100**

Source: ***Primary data, 2024***

4.2 Number of years spent in maize farming

The findings revealed (44%) of the farmers in Kyembogo Village were involved in maize farming for a period more than 6 years, while the least (2%) of the farmers have been engaged in maize farming for less than a year. This indicated that very few participants are new to the practice, which indicates a high level of experience among the majority of the respondents (Table 2).

Table 2: Number of years spent in maize farming

Number of years	Frequency	%
Less than one year	1	2%
1-3 years	6	13%
4-6 years	18	40%
More than 6 years	20	44%
Total	**45**	**100%**

Source: ***Primary data, 2024***

4.3 Farmers involvement in maize milling

A majority of respondents (87%) reported to be engaged in maize milling while the least number (13%) of respondents reported not to take part in maize milling operations. This indicated maize milling being an integral activity for a majority of the farmers in Kyembogo Village. The high participation in milling suggests that many farmers are aware of the potential benefits, such as increased income through value addition to their maize crops, which could lead to higher earnings compared to selling raw maize. Similar findings were reported by Katongole, (2019) who observed that maize milling is a big business in Uganda as maize flour is an important staple food for most families, many small-scale factories have been established around the country to add value to maize and fetch premium prices (Figure 1).

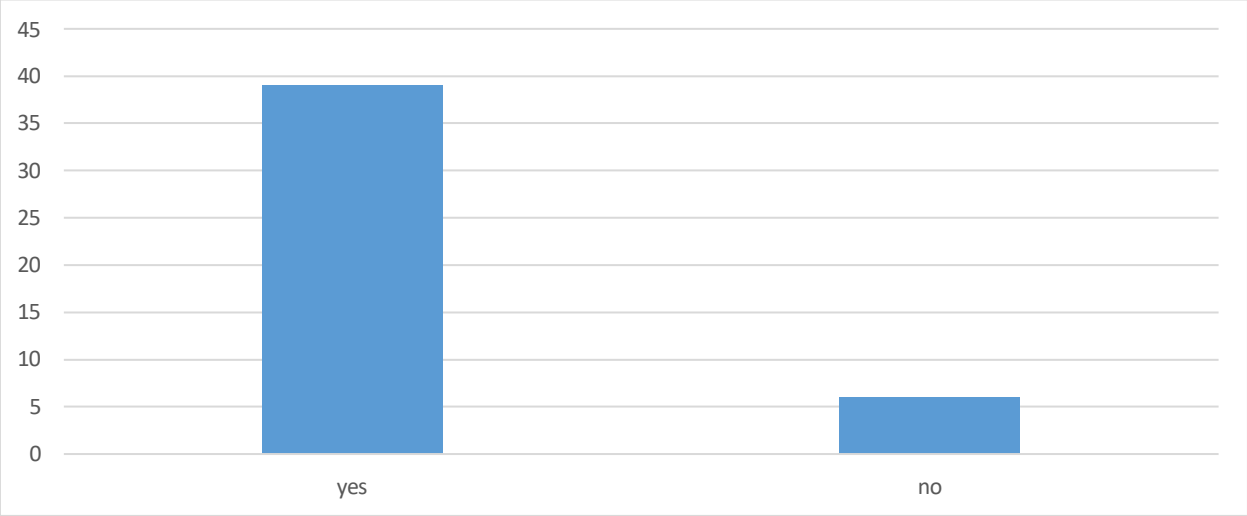


Figure 1: Farmers' involvement in maize milling

Source: ***Primary data, 2024***

4.4 Effect of maize milling on household income

A majority (56%) of respondents reported introduction of milling services to positively boost on household income streams household, while none of the respondents' reported introduction of milling services to decrease household income. Milling maize allowed farmers to sell processed products, such as flour, which may fetch higher prices than raw maize, thereby improving their financial returns. Similarly, Kiyingi, (2024) reported agricultural technology development, especially through milling and processing services contribute to agricultural growth and development through enhancing quality of products (Table 3).

Table 3: Effect of maize milling on household income

Household income	Frequency	Percentage
Increased positively	25	56%
Increased slightly	14	31%
Neutral	6	13%
Decreased slightly	0	0%
Total	**45**	**100%**

Source: ***Primary data, 2024***

4.5 Contributions of maize milling to farmer's welfare in kyembogo village

A majority of farmers (69%) reported the income generated from maize milling contributing to improved household well-being. This included enhancements in their quality of life, such as better access to food, healthcare, and other essential needs. The least number of respondents (13%) indicated that they have used the income from maize milling to invest in other enterprises. This showed that maize milling allowed some farmers to diversify their sources of income, which could improve their financial stability in the long run. This relates with findings by Katongole, (2021) who stated that maize milling is a vital component of Uganda's agricultural and industrial sectors, it plays a key role in ensuring food security, generating employment, improving incomes, and fostering economic development (Figure 2).

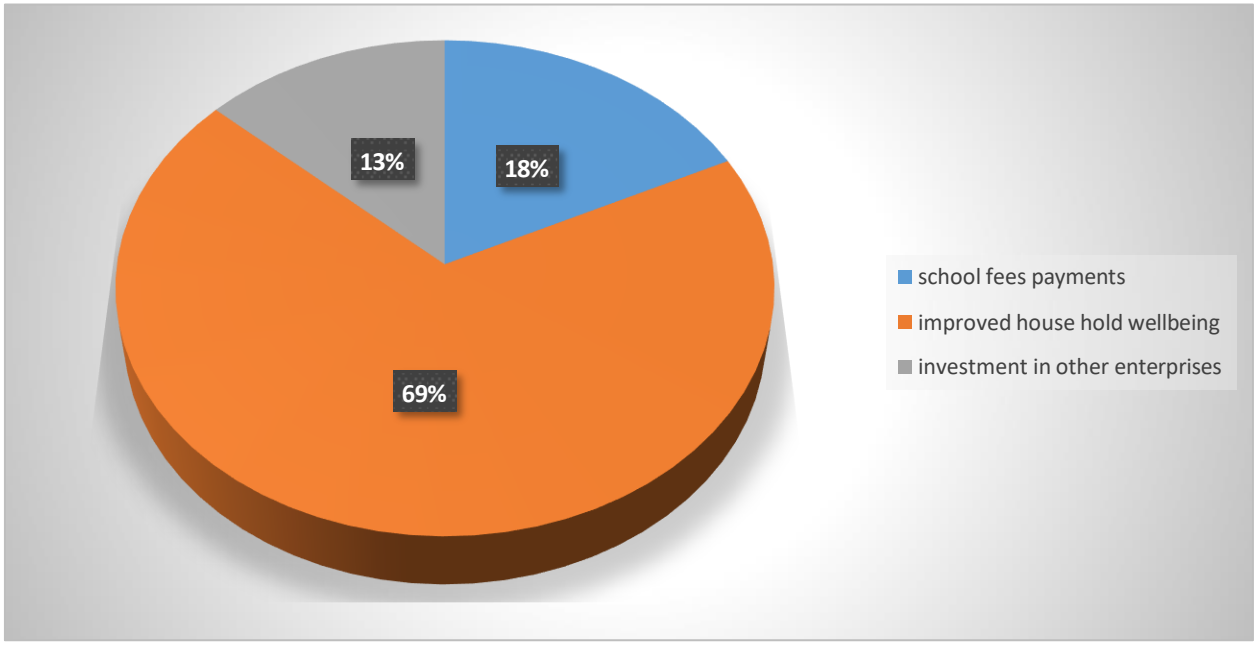


Figure 2: Contributions of maize milling to household welfare

Source: ***Primary data, 2024***

4.6 Challenges to maize milling services

The majority (53%) of respondents reported limited number of milling machines in their village, while the least number (13%) of respondents reported high costs of milling as a major challenge. These constraints led to long waiting times, reduced access to milling services, and lower efficiency in processing maize. Conversely, Mungoma, (2024) reported maize milling in Uganda being a vital sector for food security, but majorly constrained by limited availability of agro-processing machinery, especially in rural areas (Figure 3).

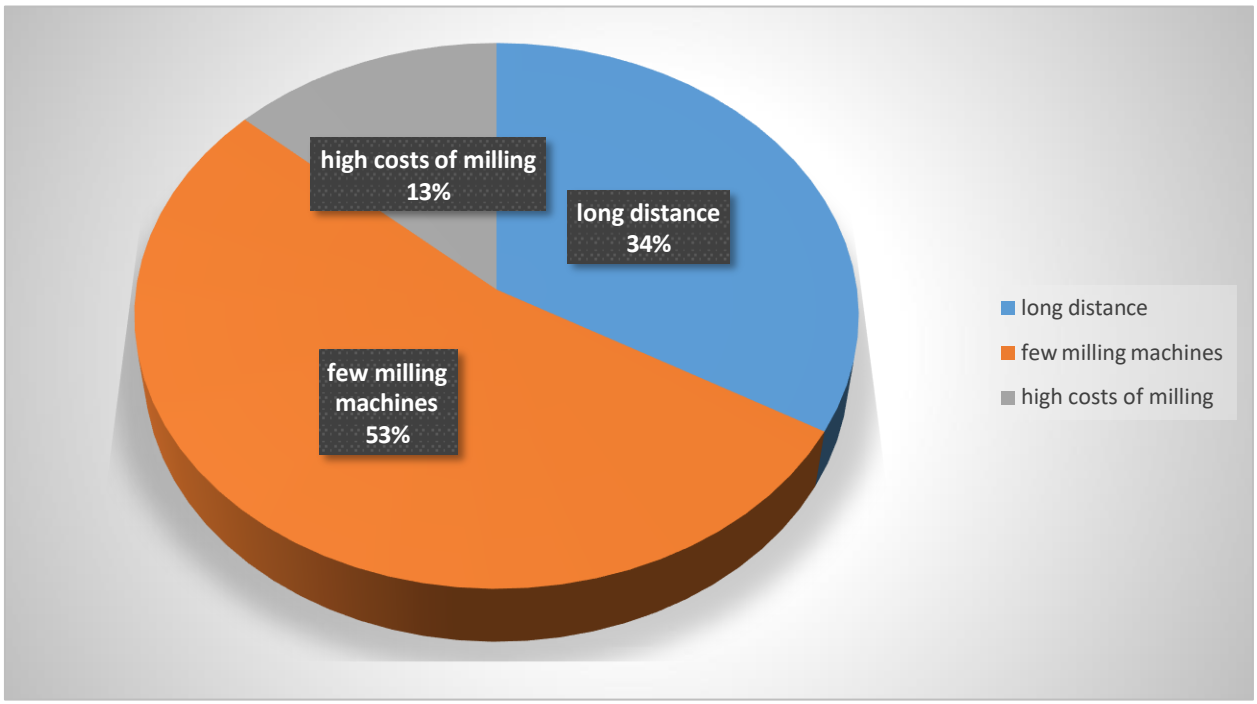


Figure 3: Challenges faced in maize milling

Source: ***Primary data, 2024***

CHAPTER FIVE

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

5.0 Introduction

This chapter presents a summary of key research findings, conclusion and recommendations made by the study

5.1 Summary of findings

i. The majority (44%) of the farmers in Kyembogo Village were involved in maize farming for a period more than 6 years, while the least (2%) of the farmers have been engaged in maize farming for less than a year

ii. A majority of respondents (87%) reported to be engaged in maize milling while the least number (13%) of respondents reported not to take part in maize milling operations

iii. A majority (56%) of respondents reported introduction of milling services to positively boost on household income streams household, while none of the respondents' reported introduction of milling services to decrease household income

iv. A majority of farmers (69%) reported the income generated from maize milling contributing to improved household well-being. This included enhancements in their quality of life, such as better access to food, healthcare, and other essential needs. The least number of respondents (13%) indicated that they have used the income from maize milling to invest in other enterprises

v. The majority (53%) of respondents reported limited number of milling machines in their village, while the least number (13%) of respondents reported high costs of milling as a major challenge.

5.2 Conclusion

Maize milling has positively contributed to the income levels and household welfare of farmers in Kyembogo Village by providing access to higher market prices, improving household standards of living, and enabling investment in other economic activities. Despite the positive impacts of milling, farmers face several challenges. The most prominent challenges include the limited number of milling machines, long distances to milling facilities, and the high costs of milling

5.3 Recommendations

Basing on results from this research on effect of maize milling on maize farmers' income levels in Kyembogo Village, Bussoro Sub-County, Kabarole District, the following recommendations were made:

i. Efforts be made to increase the number of milling machines available to farmers. This could be done through public-private partnerships or through financial support for farmers to acquire their own milling machines.
ii. Encouraging farmers to establish cooperative milling businesses could help enhance the status of maize milling
iii. Government and development organizations could assist by creating platforms or forums for farmers to engage directly with regional markets and buyers so as to maximize the profits from maize flour

5.4 Areas for further research

i. Environmental and sustainability concerns related to maize milling in Kyembogo Village present a critical area for further research, particularly as milling operations continue to expand to meet growing demand. This research would aim to assess the environmental impact of current milling practices, focusing on factors such as energy consumption, noise pollution, and waste management
ii. A comprehensive study on how milling affects the broader socio-economic conditions in Kyembogo Village, including employment opportunities, family dynamics, and community development, would provide a holistic understanding of its impact.

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APENDICES

Appendix 1: Questionnaire for farmers involved in maize milling

Dear respondent,

I am **BUKIRWA DIMINTIRIA** a student at African Rural University pursuing Bachelor of Science in Sustainable Agriculture. As a requirement for completion of the program, I am conducting a research study on the topic "effect of maize milling on maize farmers' income levels in Kyembogo Village, Bussoro Sub-County, Kabarole District". This research is strictly for academic purpose. The information you provide will be kept with utmost confidentiality. Thank you in advance for your cooperation.

SECTION A: BIODATA

Sex	
Age	
Marital status	
Education level	

SECTION B: GENERAL INFORMATION

1. How long have you spent in maize farming? (Tick that applies)

Less than 1 year ☐

1-3 years ☐

4-6 years ☐

More than 6 years ☐

2. How many acres of maize do you currently farm?

……

3. What type of maize variety do you grow? (Tick all that apply)

Hybrid ☐

Local/Traditional ☐

Other (please specify) …….

4. How many times do you harvest maize a year? (Tick that apply)

Once a year ☐

Twice a year ☐

More than twice a year ☐

SECTION C: INFORMATION ON MAIZE MILLING

1. Do you use a milling service for your maize? (Tick that apply)

Yes ☐

No ☐

2. If yes, how often do you use milling services?

After each harvest ☐

Monthly ☐

Quarterly ☐

Other (please specify) ……

3. How do you transport your maize to the milling facility?

Personal vehicle ☐

Public transport ☐

carrying on head ☐

Other (please specify) ……

3. What is the average price per kilogram of maize before milling?

……

4. What is the average price per kilogram of maize after milling?

……

6. How has milling affected your overall income from maize farming? (Tick that apply)

Increased significantly ☐

Increased slightly ☐

No change ☐

Decreased slightly ☐

Decreased significantly ☐

7. What are the primary costs associated with milling (e.g., transport, milling fees)?

……

8. Do you agree that the income from maize farming is sufficient to meet your needs?

Yes ☐

No ☐

17. If no, what primary challenges do you face in maize farming?

……
……
……

SECTION D: ADDITIONAL INFORMATION

1. What improvements would you propose to the milling process or service?

……
……
……

2. Are there any additional comments or suggestions you would like to put forward regarding maize farming and milling in Kyembogo Village?

……
……
……

Thank you for your time and participation!

Appendix 2: Observation guide

Researcher's Name: ……

Date…….

Location…….

Observable Item (write Yes/No and any additional remarks)

1. Availability of nearby market for maize and maize flour

……

……

2. Transport means available to transport maize and maize flour (e.g. boda-boda, taxis, tractors, carts)

……

……

3. Milling centers are located within short distance (under 5 km)

……

……

4. Farmers access processed maize products (flour, bran, etc.)

……

……

5. Market for milled maize products (direct sales to consumers, middlemen, wholesalers, etc.)

……

……

6. Evidence of maize storage structures (e.g., silos, maize cribs, granaries, etc.)

……

END

Appendix 3: Interview guide

Dear respondent,

I am **BUKIRWA DIMINTIRIA** a student at African Rural University pursuing Bachelor of Science in Sustainable Agriculture. As a requirement for completion of the program, I am conducting a research study on the topic "effect of maize milling on maize farmers' income levels in Kyembogo Village, Bussoro Sub-County, Kabarole District". This research is strictly for academic purpose. The information you provide will be kept with utmost confidentiality. Thank you in advance for your cooperation.

SECTION A: BACKGROUND INFORMATION

1. What is your experience in maize farming? (Duration in farming and type of maize grown)

……
……

2. What motivated you to start farming maize?

……
……

3. Can you describe your typical maize farming process from planting to harvest?

……
……

4. Do you currently use milling services for adding value to your maize?

……
……

5. What do you consider when selecting the milling service provider?

……
……

SECTION B: ECONOMICS OF MAIZE MILLING

1. What are the costs associated with milling your maize?

……
……

2. How has the milling process affected your income from maize farming?

……
……

3. What price difference is there between processed and unprocessed maize?

……
……

4. Have there been any noticeable increase in your overall income due to milling?

……
……

10. How does the income from maize farming contribute to your household's financial well-being?

……
……

SECTION C: CHALLENGES AND RECOMMENDATIONS

1. What challenges related to maize milling have you faced?

……
……
……

2. What improvements would you like to see in the milling process or service?

……
……
……

3. Are there any other factors, besides milling, that you believe affect your income from maize farming?

……
……

4. How do you see the future of maize farming and milling in your village?

……
……

5. What recommendations would you suggest to other farmers regarding milling and improving income levels?

……
……
……

6. Do you have any additional comments or thoughts about the effect of milling on your income?

……
……

7. Would you be interested in participating in a follow-up study or providing additional feedback in the future?

……
……

Thank you for your time and participation!

Appendix 4: STRUCTURAL TENSION CHART

Vision: A prosperous Kyembogo Village empowered through sustainable maize milling by 2026

Accountable	Action steps	Due date
Bukirwa	Finalizing the report and printing	16-06-2025
Bukirwa	Report writing	10-06-2025
Bukirwa	Data analysis	24-12-2024
Bukirwa	Data collection	06-09-2024
Bukirwa	Introduction	07-08-2024
Tusiime John	Departure to the field	06-08-2024

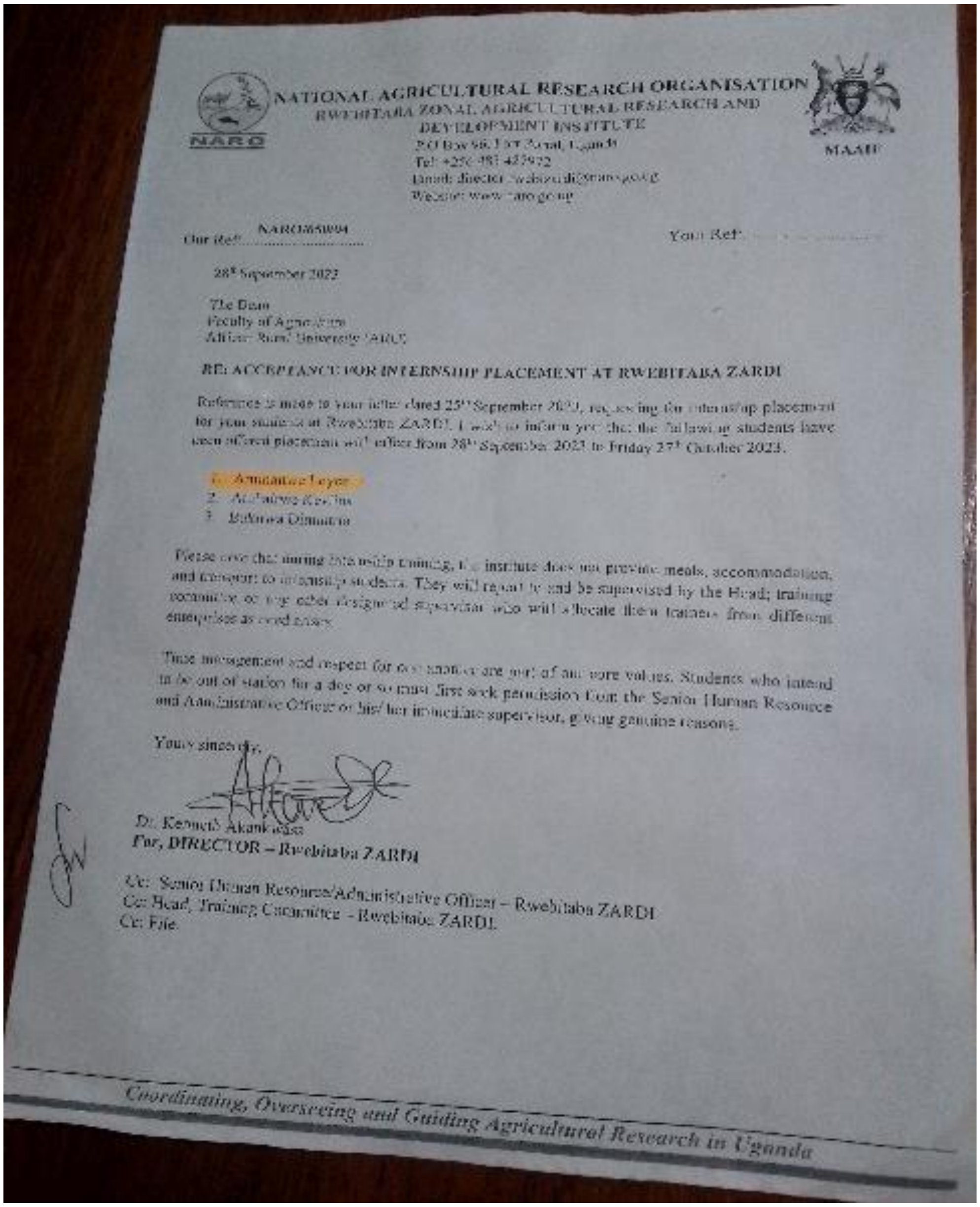
Current reality

- Have knowledge and skills on data collection
- Have knowledge on report writing
- Data not yet collected

Appendix 5: Research budget

Item	**Quantity**	**Amount**	**Total**
Rent	1	30000	30000
Electricity	Lumpsum	20000	20000
Food	Lumpsum	100000	100000
Transport	Lumpsum	20000	20000
Miscellaneous	-	110000	110000
Total			**280000**

Appendix 6: Acceptance letter



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Tel: +256 [illegible]
Email: director [illegible]
Website: www.naro.go.ug

NARO MAAIF

Our Ref: NARO[illegible]

Your Ref: ....

28[th] September 2023

The Dean
Faculty of Agriculture
African Rural University (ARU)

RE: ACCEPTANCE FOR INTERNSHIP PLACEMENT AT RWEBITABA ZARDI

Reference is made to your letter dated 25[th] September 2023, requesting for internship placement for your students at Rwebitaba ZARDI. I wish to inform you that the following students have been offered placement with effect from 28[th] September 2023 to Friday 27[th] October 2023.

1. [illegible]
2. [illegible]
3. [illegible]

Please note that during internship training, the institute does not provide meals, accommodation, and transport to internship students. They will report to and be supervised by the Head; training committee or any other designated supervisor who will allocate them trainers from different enterprises as need arises.

Time management and respect for one another are part of our core values. Students who intend to be out of station for a day or so must first seek permission from the Senior Human Resource and Administrative Officer or his/ her immediate supervisor, giving genuine reasons.

Yours sincerely,

Dr. Kenneth Akankwasa
For, DIRECTOR – Rwebitaba ZARDI

Cc: Senior Human Resource/Administrative Officer – Rwebitaba ZARDI
Cc: Head, Training Committee – Rwebitaba ZARDI
Cc: File

Coordinating, Overseeing and Guiding Agricultural Research in Uganda