

**APPLE FARMING AND ECONOMIC DEVELOPMENT OF SMALLHOLDER
FARMERSINKIGEZI HIGHLANDS: A CASE STUDY OF KABALE DISTRICT**

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**A DISSERTATION SUBMITTED TO FACULTY OF AGRICULTURAL SCIENCES IN PARTIAL
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DECLARATION

I, PRETTY BIRYOMUMEISHO, declare that; I am the author of this research report and any assistance I received in its preparation is fully acknowledged and disclosed in the report. I have also cited any sources from which I used the information, ideas or words, either quoted directly or paraphrased. I also certify that this paper was prepared by me specifically for the partial fulfillment for the award of degree in Bachelor of Agricultural Science and Entrepreneurship at Uganda Christian University.

Signed



Date 31/07/2025



APPROVAL

This is to certify that this project proposal has been submitted for examination with my approvals as the academic supervisor as a requirement for the award of a degree in Bachelor of Agricultural Science and Entrepreneurship.

Signature

UZATUNGA

Date:

31/07/2025

MR. UZATUNGA INNOCENT

Project Supervisor



DEDICATION

I dedicate this research report to my family members especially my grandmother and my course mates for their endless love and support towards my academic journey.



LIST OF ACRONYMS

FAO:	Food and Agriculture Organization
FAOSTAT:	Food and Agriculture Organization Statistics
MAAIF:	Ministry Of Agriculture, Animal Industry and Fisheries
NAADS,	National Agricultural Advisory Services
NaCRRI:	National Crops Resources Research Institute
NARO:	National Agricultural Research Organization



ABSTRACT

The study investigates the role of apple farming on the economic development of smallholder farmers in Kabale district in Kigezi region. With the increasing demand for apples both locally and internationally due to its health benefits for example, this research study aims at assessing how apples enhances smallholder farmers living standards, how apple contribute to the economy of farmers and the whole country, factors that influence the growth of apples and challenges that are faced by apple growers. Using a mixed-method approach, data was collected through interviews, questionnaire and surveys to apple farmers and extension officers of concerned sub-counties that is kyanamira, kitumba and kamuganguzi. Findings revealed that apple farming boosts income levels, creates employment to people and empowers gender and that is women. Findings also showed that a number of factors influences apple growth and that is water availability, fertile soils, good and favorable climate, and agronomic practices determines and contributes much to apple production however there are challenges that affect apple farming such as pests and diseases, limited access to market, poor transportation and storage facilities, high input costs and lack of training and knowledge. The study concludes that farmers should form cooperatives to solve market access and high input costs problems and recommends government to improve on infrastructures to make transportation and marketing easy.



TABLE OF CONTENTS

DECLARATION.....	ii
APPROVAL.....	iii
DEDICATION.....	iv
LIST OF ACRONYMS.....	v
ABSTRACT.....	1
TABLE OF CONTENTS.....	2
CHAPTER ONE: INTRODUCTION.....	1
1.0 Introduction.....	1
1.1 Background of the study.....	1
1.2. Problem statement.....	3
1.3. Objectives of the study.....	4
1.3.1 General objective of the study.....	4
1.3.2 Specific objectives.....	4
1.3.3 Research questions of the study.....	4
1.4. Significance of the study.....	4
1.5. Scope of the study.....	5
1.5.0 introduction;.....	5
1.5.1. Geographical scope.....	5
1.5.2. Content scope.....	5
1.5.3. Time scope.....	5
1.6 Justification of the study.....	5
1.7 Conceptual framework.....	6
CHAPTER TWO: LITERATURE REVIEW.....	7
2.0.Introduction.....	7



2.2 factors that influence the growth of apples.....	8
2.3 challenges faced by apple farmers.....	9
2.4 Conclusion.....	11
CHAPTER THREE: METHODOLOGY.....	12
3.0 Introduction.....	12
3.1 Research approach.....	12
Research Design.....	12
3.3. Area of the Study.....	12
Target Population.....	12
3.5. Sample Size Determination.....	12
3.6. Inclusion and Exclusion Criteria.....	13
Inclusion Criteria.....	13
Exclusion Criteria.....	13
3.7. Data Collection Methods.....	13
3.8. Data Collection Tools.....	14
3.9. Data Analysis.....	14
3.10. Ethical Considerations.....	14
3.11. Limitations of the Study.....	14
3.12 Conclusion.....	15
CHAPTER FOUR: DATA PRESENTATION AND INTERPRETATION OF FINDINGS.....	16
4.0 introduction.....	16
4.1 Biographic distributions of respondents.....	16
4.1.1 Gender distribution of respondents.....	16
Table 1: Showing gender distribution of respondents.....	16
A pie-chart showing gender distribution of respondents.....	17



4.1.2 Age distribution of respondents.....	17
4.1.3 Marital status of the respondents.....	18
4.1.4 Level of education of the respondents.....	20
5.0 CHAPTER FIVE: DISCUSSION OF FINDINGS.....	25
5.0 Introduction.....	25
CHAPTER SIX: CONCLUSION AND RECOMMENDATIONS.....	29
6.0 Introduction.....	29
6.1 Summary of findings.....	29
6.2 Conclusions.....	29
6.3. Recommendations.....	30
REFERENCES.....	31

CHAPTER ONE: INTRODUCTION

1.0 Introduction

This study was all about the economic development of smallholder farmers and apple farming, this chapter comprises of introduction, background, problem statement, objectives of the study, research questions, significance of the study, scope of the study, justification and conceptual framework.

1.1 Background of the study.

Many smallholder farmers prefer or are engaged in production of food crops that is beans, Irish potatoes, sorghum, maize, rice and others of which are produced in a subsistence form that is production for consumption and not for sell. And this has limited the development of household income, infrastructure and the whole community. Apple farming which is both a food and a cash crop though majorly taken as a cash



crop is in position to solve the above problem faced by farmers, generation of income to farmers hence improving their living standards, development of infrastructure that is roads for transporting apples from production areas to market centers of which these roads will benefit the whole community contributing to its development. Apple production is increasing over the world as follows due to its advantages.

The Global statistics estimate that apple production reached approximately 87.5 million metric tons in 2023 (FAO, 2023). The major apple-producing countries contributing to this total include China, the United States, Poland, and Russia.

In 2023, while apples are not a major crop in Sub-Saharan Africa, some regions are slowly adopting apple farming. The total apple production in Sub-Saharan Africa is estimated at approximately 100,000 metric tons annually. South Africa, the region's leading producer, generates around 1.5 million metric tons annually, primarily for export markets (FAO, 2023).

In 2023, apple production in East Africa is relatively limited compared to other regions. While Kenya, Ethiopia, and Uganda have begun expanding apple farming, the total apple production across the region is estimated to be between 20,000 and 30,000 metric tons. In Uganda, apple production remains modest due to climatic and agricultural challenges, although it is steadily increasing.

Apple production in Uganda is increasing due to the favorable conditions in areas like Kabale for example ample temperatures and fertile soils. In 2023, Uganda's total apple production was estimated to be around 15,000 metric tons annually. Most apples are grown in the highland areas of southwestern Uganda, including Kabale and Kigezi regions. This is a substantial increase compared to previous years, as the government has been promoting fruit farming.

In 2023, the Kigezi region, known for its cool climate and fertile soils, produces around 5,000-7,000 metric tons of apples annually, with production growing as more farmers adopt apple farming. Kabale District, in southwestern Uganda, produces about 1,500-2,000 metric tons annually. Its favorable climate and altitude make it ideal for apple



farming, and despite challenges like limited knowledge of modern practices and extension services, apple farming is becoming a key income source for smallholder farmers.

1.2. Problem statement

The fruit subsector plays a crucial role in global agricultural production and national foods security, offering various socioeconomic, environmental, and nutritional benefits. Fruits contribute to improved land productivity, employment, farmers' welfare, balance of payments, and a balanced diet. Spatially, China, the USA, Turkey, Poland, Italy, India, France, Chile, Iran, and Russia account for about 75% of the total quantity of apples produced in the world(FAO 2017, Bramel and Volk, 2019) Previously many studies have been conducted concerning apples in Chencha. For instance, Girmay et al. (2014) studied apple production, marketing, and contribution to farmers' income. Fetena et al. (2014) surveyed apple varieties in Chencha; Tamirat and Muluken (2018) analysed the apple fruit value chain in Chencha; Alemu et al. (2017) investigated technical inefficiency and income variation from apple in the study site. The aim of this study was to explore the potential of expanding fruit production, specifically apple farming, in Ethiopia. This will involve assessing current challenges, identifying opportunities for growth, and providing recommendations to enhance apple farming practices, improve smallholder farmers' access to modern farming knowledge, and strengthen the fruit supply chain, from production to marketing. By addressing these gaps, the study seeks to contribute to the economic empowerment of smallholder farmers, improved food security, and sustainable agricultural development in kabale district.



1.3. Objectives of the study

1.3.1 General objective of the study.

To assess the impact of apple farming on the economic development of smallholder farmers in kabala district

1.3.2 Specific objectives.

1. To evaluate the economic benefits of apple farming to smallholder farmers in Kabale district.
2. To identify factors that influences the growth of apples in Kabale district.
3. To analyze the challenges faced by apple farmers in Kabale district

1.3.3 Research questions of the study

1. How smallholder farmers in Kabale district economically benefit from apple farming.
2. What are the factors that influence the growth of apples in kabala district
3. What are the challenges faced or encountered by apple growers in Kabale district

1.4. Significance of the study

To the farmers

it provide insights on benefits and challenges of apple farming, equipping them with knowledge to make better farming practices, which can increase yields and profitability from apples..

To the community.

the study can explore how apple farming aligns with local cultural practices and values, potentially enhancing community acceptance and participation in apple production. Can also create job opportunities to the people improving their living standards resulting to

the development of the community

To policy makers.

Findings from this study can provide valuable information for policymakers and agricultural extension services. It can guide the farming and address the challenges faced by apple farmers. It informs policies and interventions aimed at improving market access and enhancing the profitability of apple farming.

To me as the researcher.

adds knowledge on the growth of more different fruits in kabala district to improve health benefits to the people, the findings can also work as the foundation of other research for example on developing new apple variety that work very well in kigezi highlands (tolerant to harsh climatic conditions and high yielding)

1.5. Scope of the study

1.5.0 introduction;

This comprises of content scope, geographical and time scope.

1.5.1. Geographical scope

The study was carried out in Kabale district is in western region of Uganda, it was originally part of Kigezi district, before the districts of Kanungu, Kisoro, Rukungire, Rubanda and Rukiga were excised to form separate districts. Kabale is on an area of 620 square kilometers with a population of 248,700 people with a population density of 401.2 square kilometers (Uganda Bureau of Statistics 2020). Most of people in kabale district are farmers dealing in food crops that is; Irish potatoes, vegetables, sorghum, sweet potatoes, maize, peas and cattle rearing. With sorghum taking the biggest share of cropped land (kabale district local government) however some farmers have engaged themselves in apple farming.

1.5.2. Content scope

The study covers the economic importance of apples, factors that affect the apple

growth and the challenges that are faced by apple farmers.

1.5.3. Time scope.

The study run for 6month that is from November to December project proposal and January to April data collection, presentation and writing of the dissertation.

1.6 Justification of the study.

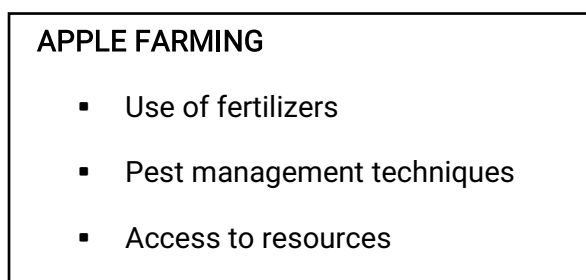
Apples play a vital role in human health and on the economy both of the farmer and the country. Many farmers have engaged in apple farming which is good as the supply increases, reducing overdependence on imported apples with their associated problems like expensive. Smallholder farmers have low levels of income from their subsistence farming that is growing of food crops like beans and maize and the study was to improve smallholder farmer's income by engaging them in apple farming that provides high returns and gives continuous harvesting seasonally.

1.7 Conceptual framework

The following is the conceptual framework for the study organic apple

Farming and economic development of smallholder farmers in Kabale district.

Independent variables



dependent variables



CHAPTER TWO: LITERATURE REVIEW

2.0. Introduction

This chapter presents literature review of concept related to the apple farming and that is the economic benefits of apples, factors that influence the growth of apples, challenges faced by apple farmers and possible solutions for the problems. The information in this chapter is got from academic journals, websites for example FAOSTAT and UBOS and different scholars regarding apple farming.

2.1 The economic benefits of apple farming to smallholder farmers

Income Generation for Smallholder Farmers, In my view, apple farming can provide a reliable source of income for smallholder farmers, allowing them to diversify their agricultural activities and improve their economic stability. This aligns with the findings of Adebayo et al. (2020), who noted that apple farming has significantly increased the income levels of smallholder farmers, especially in developing countries, by opening up both local and international markets.

Employment Opportunities: Apples are labor-intensive crops, requiring significant seasonal labor for planting, maintaining orchards, harvesting, and processing. This leads to increased employment opportunities for rural communities, especially for women and youth improving their living standards. This is almost the same with Zhou et al. (2017) study who found that apple farming creates numerous seasonal jobs,



contributing to local economic growth and offering additional income sources for families during the harvest season.

Gender Empowerment and Social Benefits: Apple farming provides women, especially in rural areas, with the opportunity to participate in economic activities and decision-making processes. Women's involvement in apple farming can lead to increased empowerment and more control over household income leading to improved living standard. This is not far with other researchers like Khandker et al. (2018) who highlighted that apple farming programs have helped empower women by providing them with skills, resources, and a platform to improve their economic status and social standing.

Increased Community Development: The success of apple farming initiatives can lead to broader community development by improving infrastructure such as roads, storage facilities, and transportation networks, which benefits not only the farmers but also the entire community. This finding is in line with Wang and Xu (2021) finding which emphasized that successful apple production projects have been key in improving rural infrastructure, enhancing market access, and fostering economic resilience in farming communities.

Value-added Products and Diversification, In my view, the processing of apples into value-added products such as juice, cider, dried apples, and apple-based snacks not only enhances the value of the crop but also provides additional income for smallholder farmers. This is consistent with the findings of Johnson et al. (2019), who highlighted that apple processing creates opportunities for local entrepreneurs and small businesses, thereby broadening the economic benefits of apple farming beyond the primary agricultural sector.

Export Potential and Regional Economic Growth, apples hold significant export potential, contributing to national income through foreign exchange earnings and boosting the country's GDP. This aligns with the findings of Choi et al. (2022), who demonstrated that in countries like Poland, China, and the United States, the apple industry plays a key role



in the national economy, benefiting both domestic consumption and international exports.

2.2 factors that influence the growth of apples

Climate and Weather Conditions. In my findings, apples thrive in temperate climates with distinct seasons, where cold winters and moderate summers are essential for optimal growth. Temperature, rainfall, and humidity play a crucial role in fruit development and yield. While warm temperatures can accelerate fruit maturation, excessive heat can stress the tree and reduce fruit quality. This observation aligns with the study by Zhou et al. (2020), which highlights how fluctuations in temperature and rainfall, particularly in regions with unpredictable weather patterns like Kabale District in Uganda, significantly affect apple production.

Soil Fertility and pH, maintaining good soil quality is essential for optimal apple growth, as poor soil can hinder root development and nutrient absorption, leading to reduced yields. This aligns with the findings of Hassan et al. (2019), who emphasize that apple trees require well-drained, fertile soils with a pH range of 6.0 to 7.0 for healthy growth. They also highlight the importance of soil treatments, such as proper fertilization and organic matter management, to improve soil fertility and promote better apple production.

Water Availability, consistent water availability is crucial for healthy apple growth, and managing irrigation is essential to avoid both drought stress and over-irrigation. This aligns with Chauhan et al. (2017), who emphasize that both inadequate water and excessive irrigation can harm apple trees. In Kabale, implementing efficient irrigation systems or water harvesting techniques can help mitigate the risks associated with irregular rainfall, ensuring a stable water supply for orchards.

Pest and Disease Management, Effective pest and disease management is essential for maintaining healthy apple orchards. In my view, using a combination of biological control, chemical treatments, and cultural practices offers the best approach to controlling pests and diseases. This is consistent with Ferguson et al. (2021), who



highlight the importance of integrated pest management (IPM) strategies to combat threats like apple scab, fire blight, and codling moth, ensuring orchard health and productivity.

Genetic Variety and Rootstocks. The choice of apple varieties and rootstocks is crucial for maximizing productivity, disease resistance, and adaptability to local climates. I believe that selecting the right rootstocks and cultivars can significantly improve yields and make farming more efficient. This aligns with Mori et al. (2022), who emphasize that appropriate rootstock and cultivar selection plays a key role in enhancing apple tree performance and resilience.

Market access, Market access and economic factors significantly impact apple farming, as local farmers struggle with competition from cheaper imported apples. Similarly, Kimanzi and Wandera (2019) highlight that imported apples, often subsidized or benefiting from better market access, pose challenges for local producers. Additionally, pricing issues, limited infrastructure, and a lack of value addition reduce profitability, limiting the sector's growth

Agronomic Practices, Good agronomic practices, such as fertilizer application, mulching pruning, thinning, and proper spacing, are essential for ensuring apple growth and productivity. This is in the same line with *(Xu, C., et al. (2021) findings which shows that proper agronomic practices such as pruning, thinning and proper spacing are essential for ensuring optimal apple growth.*

Technology Adoption, adoption of modern agricultural technologies, such as precision farming tools IPM in pests and diseases control and climate forecasting tools, can help optimize apple production. These technologies allow farmers to make data-driven decisions, improving productivity and minimizing risks associated with weather variability and pest outbreaks. This aligns with *(Dumont, B., et al. (2020) who found that technology adoption for example automated irrigation systems and climate forecasting tools are very crucial in improving production and minimizing risks associated with weather conditions*

2.3 challenges faced by apple farmers

Selecting the fungicide, in my view, selecting the right fungicide is a critical challenge for apple farmers, as incorrect or excessive use can harm both the environment and crop quality. Boyer and Liu (2004) highlight that improper fungicide use can lead to fungal resistance, making disease management more difficult. To address this, farmers need better training on fungicide selection, efficacy, and application methods. Jankuloska et al. (2018) suggest that government support through educational programs and promoting environmentally friendly fungicides can help resolve this issue.

Transportation challenges, In my view, transportation challenges, including poor road infrastructure and lack of cold storage, are major issues for apple farmers, especially smallholders. Weinberger and Thomas (2007) and Zbanca and Negritu (2013) note that poor roads and limited transport access hinder market delivery and increase costs. To address these challenges, improving rural roads, creating transport cooperatives, and investing in cold storage are key solutions, as suggested by Boehm et al. (2021) and Khan et al. (2022)

High Input Costs. In my view, high input costs, including fertilizers, pesticides, and labor, make apple farming financially challenging for smallholders. To address this, investing in local production of inputs, offering subsidies, and improving access to credit can help reduce costs. Malik and Choure (2014) also note that high input costs result from limited availability and the need for transportation, leading to lower profits and reduced financial viability. Providing support for local input production and access to affordable credit would help farmers invest in modern farming techniques and improve yields.

Unseasonal snowfall and frost during the flowering season. In my opinion, unseasonal snowfall and poor market access are major challenges for apple farmers, leading to financial losses and reduced profits. To address these issues, improving infrastructure, providing better market information, and developing resilient farming techniques are essential. This aligns with Swarup and Sikka (1987) and Deepa (2008), who emphasize the impact of unseasonal snowfall on apple yield and quality, and Javid (2004), who highlights the importance of market access and fair pricing. Investment in storage,



transport, and market intelligence would significantly benefit farmers.

Market Access. In my view, limited market access and lack of proper infrastructure hinder apple farmers from selling their produce at fair prices. To resolve this, improving storage, transportation, and market intelligence is crucial. Javid (2004) also highlights how middlemen exploit farmers, leading to lower profits, and emphasizes the need for better market access and infrastructure. Investing in these areas would help farmers make informed decisions and reduce wastage, ultimately improving their profitability.

Climate Change, In my view, climate change is significantly impacting apple cultivation in the Kashmir Valley, with rising temperatures leading to increased pests, diseases, and unpredictable weather events. To mitigate these effects, farmers should adopt climate-resilient practices such as crop diversification, improved irrigation management, and organic farming methods. This aligns with Khorshidi et al. (2010), who note the challenges posed by climate change, including increased pests and diseases, changing flowering times, and reduced water availability. They emphasize the importance of adaptive strategies to maintain apple production and farmers' income.

Knowledge and training gaps In my view, climate change is increasingly threatening apple cultivation in the Kashmir Valley, with erratic weather patterns, such as untimely rains, frost, and rising temperatures, negatively affecting crop yield and quality. To address these challenges, farmers must adopt climate-resilient farming practices, such as crop diversification, efficient irrigation management, and organic farming techniques, which can mitigate the adverse effects. This aligns with Khorshidi et al. (2010), who highlight the impact of climate change on pest outbreaks, unpredictable weather events, changes in flowering time, and water availability. They emphasize that adopting adaptive strategies is crucial to protect apple production and ensure the sustainability of the industry.

2.4 Conclusion

In conclusion, apple farming faces numerous challenges, including climate change, pest and disease management, high input costs, and limited market access. These issues



significantly impact the quality, quantity, and profitability of apple production. However, by adopting climate-resilient farming practices, improving infrastructure, and enhancing access to credit and insurance, farmers can mitigate these challenges. It is crucial to provide farmers with the necessary training, resources, and support to enable them to navigate these obstacles and sustain apple farming as a vital economic activity in the region.



CHAPTER THREE: METHODOLOGY

3.0 Introduction

This chapter focuses on the research approach, research design, area of the study and target population, sample size determination, sampling techniques, inclusion and exclusion, data collection methods, data collection tools, data analysis, ethical consideration, and limitations or challenges of the study.

3.1 Research approach.

The study adopted mixed-method approach, as it allows comprehensive understanding of impact of apples farming on smallholder farmers' economic development. This method combines both qualitative and quantitative methods that are for example collecting numerical data on the economic benefits of apple farming like income and gathering qualitative insights into the challenges and lived experience of smallholder farmers engaged in apple farming in Kabale district respectively.

Research Design

A case study research design will be used as I will be doing my study in Kigezi region but majorly in Kabale district. This research design was because the researcher wanted to go in details of small population or a specific area in a region or country that us kabala district in kigezi region.

3.3. Area of the Study

The study was conducted in Kabale District, located in the southwestern region of Uganda. This district is known for its favorable climate for apple farming and hosts a significant number of smallholder farmers involved in apple production. The area is chosen due to its relevance to the research topic, given the increasing interest in apple farming as a potential income-generating activity for smallholders. The annual rainfall of kabala is 418.6 millilitres thought the year, the area normally receives too much rain in months of September, October, November, March, April and May and in other months



rainfall is little or no rain.

Target Population

The study consisted of smallholder apple farmers that have been in apple farming for more than one year and sub-county extension officers that is Kitumba, Kamuganguzi and Kyanamira in Kabale district.

3.5. Sample Size Determination

Purposive sampling was employed to select farmers who were actively engaged in apple farming and purposively selection of sub-counties that are leading in apple production in Kabale district that is Kitumba, Kyanamira and Kamuganguzi. NAADS service providers for the respective sub-counties provided lists of all apple farmers from which respondents were randomly selected, 93 participants were randomly selected from these lists, 30 participants from each sub county and 3 key informants were interviewed that is extension officers at every sub county. The number was expected to provide sufficient data for a comprehensive understanding of the economic impacts of apple farming.

Category of people	Number of population	Sample size
Apple farmers	100	90
Extension workers	9	3

3.6. Inclusion and Exclusion Criteria

Inclusion Criteria

Smallholder farmers who have been involved in apple farming for more than one growing season, Farmers who cultivate apples either for local consumption or for market sale, Key informants who are knowledgeable about the apple farming sector in Kabale District, including agricultural extension officers and NAADS service providers in



corresponding selected sub-counties.

Exclusion Criteria

Farmers who do not engage in apple farming, Farmer who are involved in apple farming but have not spend more than one season in the system and finally people who are not farmers like tour guilds in Kabale district.

3.7. Data Collection Methods

Questionnaire method, the researcher used a set different questions concerning apple farming like productions yields got every season, costs involved in apple farming and challenges faced in apple farming were given to the respondent to answer. The method was very flexible as sometimes questions were sent online to the respondent.

Interview method, the researcher (me) interfaced the interviewee for example smallholder apple farmers and asked him or her some questions then the the interviewee responded. Here the researcher even used the phone to record what the respondent said .the method was very convenient as the researcher got the valid information from the right person.

3.8. Data Collection Tools

Audio recorders, the researcher interfaced the respondent asked him questions while using this gadget to record the voice and later played the audios recorded in his free time to analyze the data collected or what the interviewee responded.

Structured questionnaire, the researcher set questions to the interviewee and these questions were in a specific format and a limited set of response were required.

3.9. Data Analysis

Editing, data that was collected using the questionnaire was edited by the researcher to ensure accuracy, competence and consistency there and mistakes that were made by the respondent were corrected.



Transcription, the researcher played the audio he recorded while interviewing the respondent and then put the information in writing.

Coding the data to identify themes related to the economic benefits, challenges, and impacts of apple farming from the information got from the respondent.

Tabulating, after coding data, it was then recorded in tables in form of frequencies and percentages basing on the objectives of the study.

3.10. Ethical Considerations

The study maintained ethics regarding the respondent and made sure they were secured.

Confidentiality, All personal and sensitive information provided by participants was kept confidential and used solely for the purpose of this research. Pseudonyms was used in reporting.

Right to Withdraw, Participants were informed that they have the right to withdraw from the study at any time without any negative consequences.

3.11. Limitations of the Study

Many limitations were faced during the study and were concerned with time, geographical area, dispersed of farmers and costs.

Time Constraints, The study's scope was limited by time, particularly in terms of the number of interviews that were to be conducted.

Geographical area, the area was steppywhich made it difficult and hard for the researcher to move during data collection.

High costs involved, that is the money for transport to go in the field to collect data, money to pay and compensate respondents time wasted.

Dispersion of farmers, smallholder farmers in kabala district were dispersed and this



made it difficult for the researcher to use some methods in data collection like focus groups.

Language Barriers, Some participants spoke local dialects that require translation, potentially affecting the depth and accuracy of responses.

3.12 Conclusion

In conclusion, the methodology aimed to provide an in-depth understanding of the economic impact of apple farming on smallholder farmers in Kabale District, while addressing the challenges and opportunities in the sector. The combination of qualitative methods and ethical considerations ensured the study was comprehensive and respectful to the participants.



CHAPTER FOUR: DATA PRESENTATION AND INTERPRETATION OF FINDINGS

4.0 introduction.

The study focused on apple farming and economic development of smallholder farmers in kabale district. The findings from the study were presented and analyzed chronologically based on objectives of the study as were formulated in chapter one of this report.

4.1 Biographic distributions of respondents

4.1.1 Gender distribution of respondents

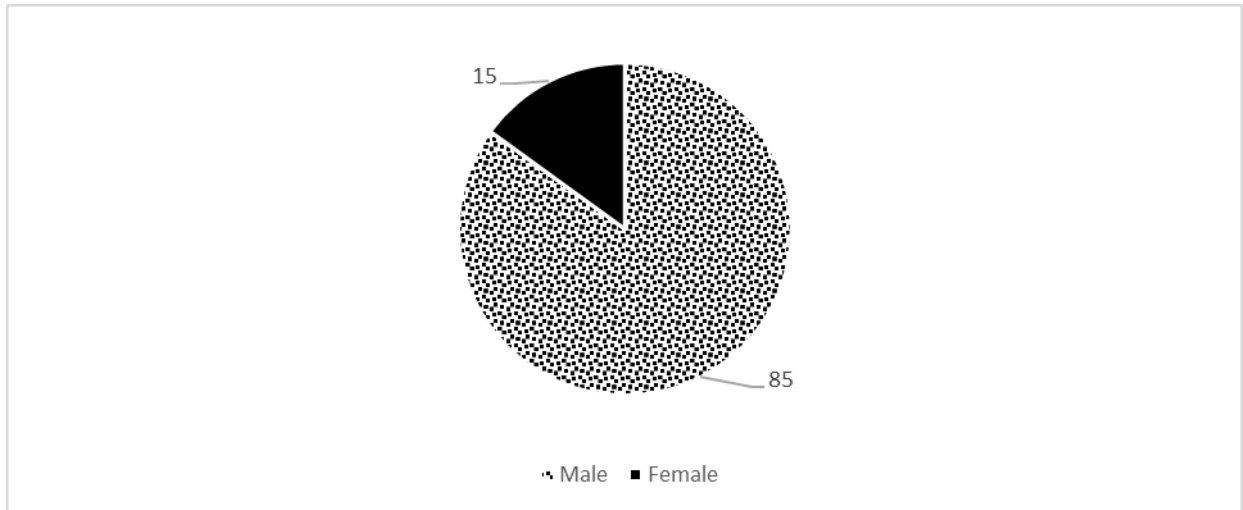
This study targeted both male and female which gave a verity of findings that were not biased making it gender sensitive as in table 1 below.

Table 1: Showing gender distribution of respondents

Gender	Frequency	Valid Percent
Male	51	85
Female	09	15
Total	60	100

Source: Primary Data, 2025

A pie-chart showing gender distribution of respondents



The study found out that the majority of the respondents were male as compared to the female. The number of males who participated in the study was represented by 51 (85%) as compared to 09 (15%) of the respondents who were female.

4.1.2 Age distribution of respondents

The age distribution of the study respondents was also as an important factor. According to the study findings the respondent ages views were as follows;

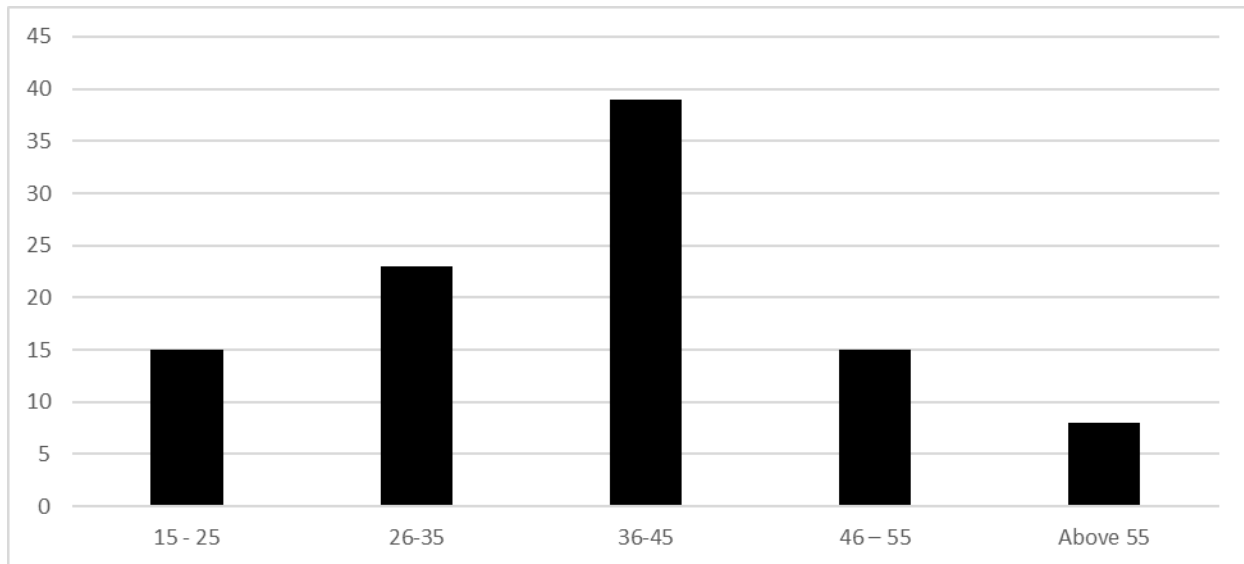
Table 2: Showing age distribution of the respondents

Gender	Frequency	Valid Percent
15 – 25	09	15
26-35	14	23
36-45	23	39
46 – 55	09	15

Above 55	05	08
Total	60	100

Source: Primary, data 2024

A bar graph showing age distribution of the respondents



The table above shows that most of the respondents were between the ages of 36 - 45 accounting for 23 (39%). The other category of the respondents was in the age range of 26 - 35 reported by 14 (23%) of the study respondents and these respondents' views were very important for the study.

More, 09 (15%) of the study respondents comprised of those who were in the age blanket of 15- 25 and 46 – 55 each respectively. These respondents' views were so great in the process of analyzing the study variables that helped to understand the problem that was at hand.

Lastly, 05 (05%) comprised of the respondents who reported to have their ages above the range of 55 and above years. The age composition of the study respondents could therefore be important factor in generating valid yet reliable information in relation to the issues concerning apple farming and economic development of smallholder farmers in Kabale district.

4.1.3 Marital status of the respondents

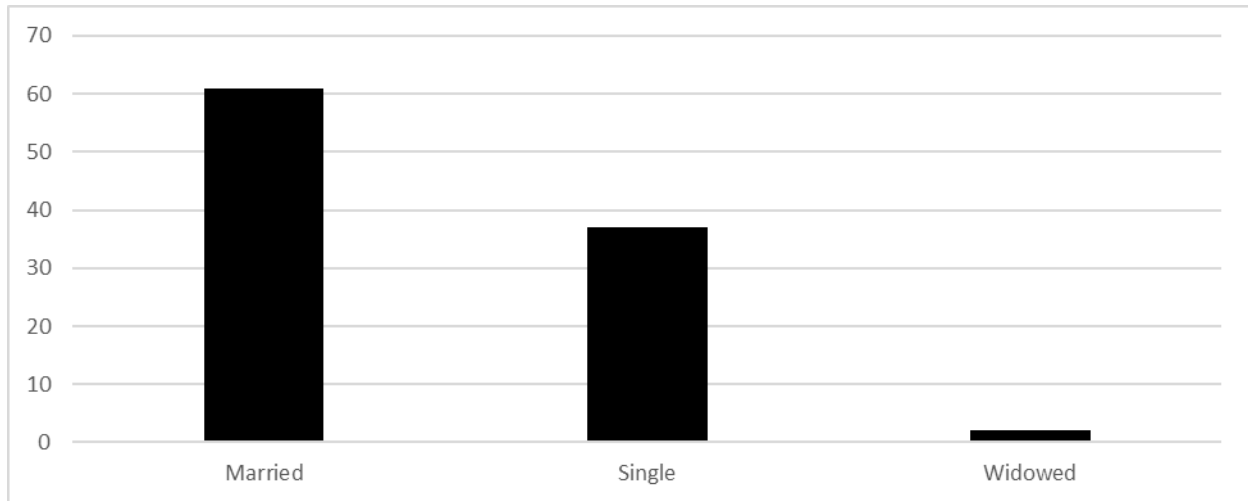
The marital status of the respondents was also covered and analyzed. This contained of those who were married, single, widowed, and separated as indicated in the table below.

Table 3: Showing marital status of the respondents

Marital status	Frequency	Valid Percent
Married	37	61
Single	22	37
Widowed	01	2
Separated	00	00
Total	60	100

Source: Primary data, 2025

A bar graph showing marital status of the respondents



As seen in the table above, majority of the study respondents constituting 37 (61%) were married and these were followed by respondents who were single as was reported by 22 (37%) of the respondents, then 01 (02%) who was widowed.

All these respondents of the study regardless of their status were all willing to provide the information that was required by the study that helped in understanding the study problem that was under investigation. That their views were very important as were relevant to the study.

4.1.4 Level of education of the respondents

In order to get information from all categories of people with different levels of education were all approached during the study process. This established the levels of education of the respondents as indicated below;

Table 4: Showing level of education of the respondents

Level of education	Frequency	Valid Percent	Cumulative Percent
Primary	00	00	00
Secondary	07	12	12
Degree	33	55	67
Master	03	05	72
Others(diploma)	17	28	100
Total	60	100	

Source: Primary data, 2025

As revealed in table above, most respondents constituting 33 (55%) had attained degree level of education. These had the highest level of education and hence more likely to have understanding apple farming and economic development of smallholder farmers.

The other 17 (28%) of the respondents were educated to others (e.g. Diploma). These respondents provided very vital information that helped the researcher in the process of writing her report as the study problem at hand was clearly revealed. Furthermore, 07 (12%) of the respondents were educated to secondary level.

The least 03 (05%) of respondents were educated up to masters level. This also showed that these respondents' views were vital in relation to the study of apple farming and economic development of smallholder farmers in Kabale district.

4.2 Economic benefits of apple farming.

Table 5 showing the economic benefits of apples.

Economic benefits	Frequency	Validity
Income generation	20	50
Employment opportunities	16	27
Gender empowerment	14	23

Source: field data, 2025.

As presented in the table above, majority of respondents totaling 20(50%) said that apple farming is a source of income after when harvested and sold. Respondents said that the income generated in apple farming is used in improving their living standards like paying childrens school fees plus other things and also in development of other aagriculture sections forexample buying nutritious feeds for the animals.

As presented in the table above, the study respondents totaling 16(27%) said that apple farming creates employment to different people that is to work in apple farm like pruning, weeding, mulching and harvesting. Many people be employed and therefore becomes easy for them to improve their living standards.

As presented in the table above, 14(23%) said that apple farming has contributed much in gender empowerment were women are also given a chance at deal in farming and this improves their courage and livelihood as they re able to also pay their children’s school fees and buy their necessities for example new styled clothing’s and print new hair styles.

4.3 factors influencing the growth of apples

Table 6 showing factors influencing the growth of apples.

Factors influencing apple farming.	Frequency	Validity(%)
Water availability	10	16
Fertile soils and Ph	18	30
Agronomic practice	11	18
Climate and weather condition	12	20



Market access	4	7
Pest and disease management	5	9

Source: primary data 2025

According to the study findings, majority of respondents 18(30%) showed that fertile soils contributes and determines so much the growth and yield of apples. Fertile soils characterized by good Ph that is not acidic, with large population of microorganisms and good texture is good for apple farming. Poor soil can hinder root development and therefore affecting both growth and productivity of apples.

As presented in the table above, respondents totaling to 10(16%) said that leaving other factors constant, water is very vital in apple growth and yield performance. Water also determines the fertility of the soil (moisture) dry soil can't allow the apple seedling to grow and therefore affecting the whole performance of the apples.

As presented in the table above, respondents totaling to 11(18%) said that the way one manages his apples determines both growth and the whole performance. Agronomic practices for example mulching, weeding and pruning are very important as they help in restoring the moisture in the soil, reduces competition for nutrients between weeds and apples and improves air circulation respectively.

As presented in the table above, respondents totaling to 12(20%) said that climate and weather determines much on apple growth and performance, apples prefer cool areas in highland regions like the Kigezi highlands that is Kabale district. Cold conditions favour the growth and therefore yield of apples.

As presented in the table above, respondents equaling to 4(7%) said that accessibility to market is a major factor in apple farming since apples need ready markets as they are very perishable and can't be kept for long time. Most of respondents sell their apples to supermarkets and to the community though some few export their harvests.

According to the table above, respondents equaling to 5(9%) said that there are very many pests that attack apples for example birds especially when apples are almost



ready for harvest. When strategies are not put in place concerning controlling these birds from eating apples, can reduce the quality of apples and leading to losses.

4.4 challenges faced by apple farmers.

Table 7 showing the challenges faced in apple farming.

Challenges faced by apple farmers	Frequency	Validity
Transportation and storage	21	51
High costs of input	15	27
Market access	8	10
Knowledge and training	10	12

Source: field data, 2025

As presented in the table above, respondents totaling to 21(51%)said that the biggest challenge they face is lack of transportation and storage facilities and this had made them to incur losses during transport and selling their products on low prices as they don't have storage facilities to store apples and wait for the prices to go high.

As shown in the table above, 15(27%)respondents said that the other challenge they have is high costs of inputs for example fertilizers to be used in Improving soil fertility and at the end in benefit-cost ratio they find they are not gaining in apple farming instead making losses. The expenditure is higher compared to the income or profit.

As seen in the table above, respondents equaling to 8(10%) said that their farms are located in rural areas while market centers in urban areas making it hard for them to find those markets and sometimes transporting their produce as infrastructures that is roads in rural areas are unimproved.

According to the table above, respondents totaling to 10(12%)said that they lack knowledge and training about growing and management of apples for the good performance. The extension service have failed to extend services to theses farmers



especially those allocated in rural areas, they just manage apples according to their knowledge and end up making or getting low income.

5.0 CHAPTER FIVE: DISCUSSION OF FINDINGS.

5.0 Introduction.

In this chapter, discussions of the findings were made basing on the findings from chapter four. This discussion was done according to major study theme in relation to the study objectives.

5.1 Discussion of the findings.

5.1.1 Economic benefits of apples.

The study respondents totaling to 20(50%) said that apple farming is a source of income to farmers and local economies since are highly demand due to their health benefits. This is supported by Kumar A and Singh R(2021) who found that apple farming in Himachal Pradesh has increased household incomes, with farmers reporting a 30% increase in annual earnings compared to other crops. The finding is also supported by Kader and Rolle (2010) who discussed how the production and sale can significantly contribute to local and national economies. They highlight that apple orchard can provide a steady income for farmers, especially in regions where apples are primary crop. The author suggests that improving supply chain logistics and reducing post-harvest losses can enhance income generation from apple sales. The author recommended investing in better storage and transportation methods to minimize spoilage and ensures that apples reach markets in optimal conditions to improve income generation.

The study respondents totaling to 16(27%) said that apple farming creates employment to different people that is to work on nurseries apple fields and harvesting. This is supported by Sharma, P, and Gupta, S.(2020)who highlighted that apple orchard have created thousands of seasonal jobs, significantly reducing unemployment rates in rural communities. The study finding is also supported by FAO(2021)that emphasized that apple production creates numerous employment opportunities, from farming to



processing and distribution. The report notes that apple orchards require seasonal labor, which can provide jobs for the local community, particularly in rural areas. However, the report also points out that employment can be precarious and often lacks benefits.

A number of study respondents totaling 14 (23%) said that apple farming has contributed much in gender empowerment where women are also given a chance to deal in farming and this improves their living standards. This study finding is supported by Quisumbing and McClafferty (2019) who explored how apple farming can empower women by providing them with income and decision-making power within the household. The authors note that women often play a crucial role in apple production and marketing, yet they face barriers such as limited access to resources and training. Empowering women in this sector can lead to improved family welfare and community development.

5.1.2 factors that influence the growth of apples.

According to the study findings, majority of respondents totaling 18 (30%) said that fertile soils contribute much to the growth and yield of apples, fertile soils characterized by good PH, large population of soil living organisms and well compacted is good for apple growth. This is supported by Zhang, Y., X. (2022) the authors found that well drained soils with a PH between 6.0 and 7.0 are optimal for apple cultivation. They also noted that soil fertility directly impacts fruit quality and yield, suggesting that regular soil testing and amendments are crucial for successful apple production.

From study findings, respondents totaling 10 (16%) said that leaving other factors constant, water is crucial for apple growth and production. Liu, H., and Zhang, Q. (2023) highlighted various irrigation and rain water harvesting, that can enhance water use efficiency. They found that effective water management not only improves apple yield but also contributes to sustainable agricultural practices by conserving water resources.

A number of respondents totaling 11 (18%) showed that the way one manages his apples from nurseries up to harvesting determines much the performance and yield of apples, management practices that were mentioned included weeding, manuring, pruning and pests and disease control. This is in line or supported by Smith, R. J., and



Johnson, L. (2022) who emphasized that agronomic practices like pruning not only enhance yields but also improve soil health and reduce pest pressures. They advocate for the adoption of precision agriculture techniques to optimize resource use and minimize environmental impact.

According to study findings, respondents totaling to 12(20%) said that climate and weather are crucial in apple production as apples grow well in warm temperatures. This is supported by Jones , A. L., and McCarty, M. K. (2021), the authors highlights that warmer temperatures can lead to earlier flowering, which may increase the risk of frost damage. They suggest adaption strategies such as selecting climate-resilient apple varieties and adjusting planting dates to mitigate this risk.

As presented by study findings, respondents equaling to 4(7%) said that accessibility to markets is a crucial in apple farming as apples are perishable therefore needs ready markets to reduce on losses. It was found that most apple farmers sell their apples in supermarkets though a small number of them export to outside countries. This study finding is supported by Karpa, A (2023) who found that proximity to markets, availability of transportation and access to export channels significantly affect the economic viability of apple production. He recommended that growers engage in cooperatives marketing to enhance their market and negotiate better prices.

From the study findings, respondents totaling to 5(9%) said that there are very many pests that attack and affect the apple fruits reducing the quality and leading to losses. This is supported by Gubler, W.D., and Pscheidt, J.W. (2023), the authors advocated for a combination of biological control, cultural practices and judicious use of pesticides to minimize environmental impact while maintaining yield and quality. They emphasized the importance of monitoring pest populations and implementing preventive measures.

5.1.3 Challenges faced in apple farming.

According to study findings, respondents totaling to 21(51%) said that their biggest challenge is transportation and storage facilities and this made them incur losses during transportation and selling their products at low prices since don't have storage facilities to store and wait for better high prices. This is supported by Weinberger and



Thomas, 2007; Zbanca and Negritu, 2013), authors said limited access to transportation cost by farmers can make it challenging to transport their produce to markets or storage facilities. They also said transportation costs can be high particularly for small-scale farmers and lack of cold storage facilities can result into spoilage of apples leading to reduced quality and low prices.

From the study findings, respondents totaling to 15(27%) said high costs of inputs for example fertilizers and pesticides are very high and this affect their cost-benefit ratio where they find investment is higher compared to profits or income got. This is supported by Malik and Choure, 2014). One of the main reasons for the high input costs is the lack of availability of inputs in the region. Many inputs, including pesticides and fertilizers have to be transported from other parts of the country, leading to higher prices.

A number of respondents from the study findings totaling to 8(10%) said that their farms are located in rural areas while market centers in urban areas or towns making it difficult to access the market and this increases transportation costs and sometimes losses. This is supported by Javid, 2004 who said that lack of proper market infrastructure; limited market access and middlemen's involvement make it difficult for farmers to sell their produce at fair prices. Middlemen's often exploit farmers by paying lower prices than the market value, which can lead to lower profits for the farmers. He added that the lack of proper storage facilities, transport infrastructure, and processing units results in a lot of wastage and spoilage of the produce.

CHAPTER SIX: CONCLUSION AND RECOMMENDATIONS

6.0 Introduction

This chapter presents the summary, conclusions and recommendation of my study



findings.

6.1 Summary of findings.

Majority of respondents from study finding 20(50%) said that apple farming is a source of income which helps them to improve their living standards. This is supported by Kader, A.A., and Rolle (2010) who discussed how production and sale of apples can significantly contribute to local and national economies. They highlight that apple orchard can provide a steady income for farmers especially in regions where apples are a primary crop.

Majority of respondents equaling to 18(30%) from study findings said that fertile soils characterized by good PH, high population oh living microorganisms and well compacted is good for apple growth. This is supported by Zhang, Y., and X. (2022), the authors found that well drained soils with a PH of 6.0 and 7.0 are optimal for apple cultivation. They also noted that soil fertility directly impacts fruit quality and yield, suggesting that regular soil testing and amendments are crucial for successful apple production.

A big number of respondents totaling to 21(51%) said that transportation and storage facilities are biggest challenge they face as it leads to losses and low profits. This is supported by Weinberger and Thomas, 2007; Zbanca and Negritu, 2013 who said that limited access to transportation and high costs of transportation, lack of cold storage facilities can lead to losses due to increased transports cost and spoilage of the produce.

6.2 Conclusions

In conclusion, apple farming play a crucial role in people's livelihood as it generates income to them, improving their living standards, gender empowerment , employment opportunities, and development of the community. However there are the factors that influence the growth of apples; climate and weather, soil fertility, agronomic practices, pests and disease management and market access. Apple farming not being a primary crop in Kigezi region; Kabale district faces many challenges and that is transportation and storage facilities limited, limited access to market, pests and diseases and change



in climatic conditions.

6.3. Recommendations.

Basing on the study findings and conclusions made, the researcher recommends the following.

Cooperatives; farmers should form cooperatives as this eases market access, negotiation powers and reduction in input costs and therefore reduction in losses and improving on profits.

Government subsidies; the government should provide subsidies to farmers like seeds and fertilizers as a way of empowering and supporting smallholder farmers.

Improvement of infrastructure; the government should develop and improve infrastructures especially roads and markets to easy transportation of produce from production to market areas and easy marketing hence reducing losses and improving on profits.

Knowledge and training; extension workers should provide training to farmers concerning apple production including management practices and harvesting.

Value chain; farmers should look for the ways to improve the value of apples to reduce on spoilage and improve the shelf life (processing). This can be done through cooperatives or government.

Areas for further investigation

The next researcher should carry on a study about the best type of apple that work very well in Kabale district

The next study should be on how people can use apple trees as agroforestry trees especially those with small pieces of land but interested in apple growing.

The next investigation should be about how small holder farmers should use apples to improve their health and living standards.

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QUESTIONNAIRE

TO THE FARMERS.

UGANDA CHRISTIAN UNIVERSITY

BISHOP BARHAM UNIVERSITY COLLEGE KABALE

APPLE FARMING AND ECONOMIC DEVELOPMENT OF SMALLHOLDER FARMERS IN
KABALE DISTRICT.

SECTION A

Location and respondent identity

District

Sub county.....parish.....

Respondent name.....sex.....age.....education
level.....

Name of the researcher.....contact no.
.....

SECTION B

Household characteristics (composition)

No	Parameter	Response
A	Head of the family (adult male, adult female, youth male , youth female)	
B	Total members of the household	
C	How many members of the household work on the apple farm.	
D	Education level of the head of the family or the respondent and any member of the	



	family working on the apple farm	
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SECTION C

Farming system characteristics.

No	Parameter	Response
A	How many pieces of land do you own.(the researcher should be able to estimate the number if acres in case the respondent doesn't know how to measure land in acres)	
B	The total or percentage of land that is under animal production or pasture.	
C	The total or percentage of land under crop production and of which crops. The farmer should specify the crops being grown.	
D	The percentage of land under apple farming or production.	
E	How many apple trees do you have and the type of apples grown.	
F	How long have you been in apple farming.	
G	Do you own the land or you hire it and if yes at how much.	



SECTION D

Inputs in apple production

No	Parameter	Response
a	Do you use fertilizers, if yes specify whether organic or inorganic fertilizer	
(i)		
(ii)	If organic do you get it from your farm or you buy it outside your farm(green manure, composite, chicken, animal manure)	
(iii)	If inorganic how much do you use in an acre in terms of kilogram's	
b	Do you use pesticides or any chemical to spray and if yes specify the chemical used and its use in apple production.	
(i)		
(ii)	How often do you spray in a season?	
(iii)	How much do you put in chemicals	
C(i)	Source of labor specify whether family labor or hired labor	
(ii)	If family labor how many are engaged in	
(iii)	If hired, how many and how much do you pay each per day	
(iv)	If both state which level that is (low, average, high)	
d(i)	Any equipment used on the farm	
(ii)	If any specify it and tell its use in apple production	
(iii)	How much did you buy the equipment and how durable it is.	

SECTION E

Revenue per season.



A	How much do you put in buying chemicals	
B	How much do you put in fertilizers	
C	How much do you put in labor	
D	How much do you invest in equipments used on the farm	
E	How much do you put in land if rented	
F	After harvesting and selling if you deduct the expenses or costs of production do you find when you have made some profits or.	

SECTION F

Apple sales

A	Where do you sell your apples from(individual customs, internal markets, export, others)	
B	How much do you sell one apple	
C	How many apples do you sell in every harvesting season?	

SECTION G

Challenges incurred in apple production and how you overcome them

No	Problem	Solution
1.		
2.		
3.		
4.		

SECTION H

Benefits of apples

A	Have apples helped you in household income development(the respondent should be able to explain in which ways for example paying children	
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	school fees and others)	
B	Has apple farming contributed to the community or society development and if yes how(the respondent is expected to be specify and clear for example by telling the hired labor on the farm developing their living standards after they are paid)	

Kindly give a comment about apple farming and what you would recommend for future planning.

I thank you for your cooperation and response may GOD bless you abundantly.

The information received from the respondent shall be used for only research purposes and case of any concern the respondent deserves to have.

TO THE EXTENSION OFFICER

BISHOP BARHAM UNIVERSITY COLLEGE KABALE

I am PRETTY BIRYOMUMEISHO doing research on apple farming and economic development of smallholder farmers in kabale district.

You have been chosen as the sub county extension officer kindly answer the question asked. The information given shall only be for academic purposes thank you.

Respondent identity

District.....Sub county.....

Gender.....age.....



Education level.....



SECTION B

Question guide

- (a) How many apple farmers are in this sub county
- (b) Farmers do apple growing on small scale o large scale
- (c) Which other fruits are grown in the sub county
- (d) Which type of apple are being grown in the area
- (e) What is the favorite and common type of apples grown in this area
- (f) Does the government in one way or the other help apple farmers for example like giving them subsidies if yes mention them
- (g) Where do farmers sell their apples after harvest?
- (h) Mention two common or general challenges faced by apple producers in your area.



