MAKERERE   **UNIVERSITY**

COLLEGE OF AGRICULTURE AND ENVIRONMENTAL SCIENCES

SCHOOL OF AGRICUTURAL SCIENCES

DETERMINANTS OF POST HARVEST ECONOMIC LOSSES OF PINEAPPLES AMONG FARMERS IN NAZIGO SUB COUNTY KAYUNGA DISTRICT

BY

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A RESEARCH REPORT SUBMITTED TO THE DEPARTMENT OF AGRIBUSINESS AND NATURAL RESOURCE ECONOMICS AS A REQUIREMENT FOR THE AWARD OF A BACHELORS DEGREE IN AGRIBUSINESS MANAGEMENT OF MAKERERE UNIVERSITY

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DECLARATION

I .WABUZIBU .J. hereby declare that the work presented here is original and has never been submitted for any award to any university or institution of higher learning.

Signed....... Wabuzibu ....

DATE..22.|.12.|.2022

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Student

APPROVAL

This dissertation is submitted with the approval of the following supervisor

SIGNITURE.......................... DATE.......22/12/2022

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DEDICATION

To my father whose love and care has made me what I am today and my relatives who have supported me financially.

ACKNOWLEDGMENTS

I sincerely acknowledge the supervisor whose suggestions were instrumental in preparing this research. Evidently this research would not have been possible without data therefore great thanks to farmers who gave me great assistance in obtaining data. I also thank the academic staff of this institution for knowledge imparted which has been so influential.

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ABSTRACT

The study investigates the causes and economic effect of post harvested losses among the pineapple farmers in Kayunga District. The aim of the study is to identify causes of losses among pineapple farmers. The study looks at characteristics, causes and impact of losses among the farmers. The research applied a cross sectional research design among the farmers in Kayunga .a purpose method of sampling was used to select the sub county and random sampling technique was used to select 72 farmers in the Subcounty. Data analysis was done using descriptive statistics on the first two objective and the regression was used to show the marginal effect of causes and social economic characteristics on the quantity of losers. According to the results we conclude that the average age of farmers is 46 and that 44% of the farmers are above 45 years. The business is mostly composed of men who have enough land or rights to land and a few females who can that is only 38%. Most farmers about 40% of total farmers had attained secondary education and at least 34% of farmers had degrees and diplomas. This shows that at least the farmers are literate and 26% only of farmers have spent 1ess than 8 years in school. The highest number of farmers' start their farming business using personal savings, about more than half 54% of Farmers depend on their own income. Only 16% of the total farmers started farming business-using loans. About 82% of the farmers had families or married and only 18% of total farmers are not married. From the results obtained from the analysis the most significant cases of postharvest losses is perish ability. The other causes of post-harvest losses were poor handling at 30%, weather at 20% and theft at 10%. According to the regression model The results showed only theft among the causes of losses was not significant. gender, education level experience of a farmer, marital status and transport were the significant social economic characteristics. All the three causes of losses were also significant. Farmers who suffered losses due to poor handling lost 56 pineapples less compared to other farmers who suffered losses due to other causes. Farmers who lost pineapples due to perish ability lost 51 pineapples compared to farmers who lost pineapples due to other losses

The research recommended for the government's intervention to introduce credit facilities and strengthen other finance interventions to encourage farmers buy or setup better storage facilities to prevent postharvest losses

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CHAPTER ONE

INTRODUCTION

</div>

1.1 Background to the Study

Agriculture in simple terms refers to the growing of crops and keeping of livestock. Uganda's economy is primarily agricultural and supports close to 69% of the country's population which is rural (MAAIF, 2019). According to Uganda National Household Survey (UNHS 2014), Agriculture sector accounts for 26% of the GDP and 70% of the exports and employs about 70% of the employed household population. Agriculture is still a significant sector in Uganda 's economy although its contribution to the total Gross Domestic Product (GDP) has continued to decline over the years (Uganda National Household Survey, 2014. Between 2013- 2014, Agriculture was contributing 73.5% to GDP making it the key source of agriculture sector growth in Uganda, however, it declined by 14% in 2019.

However, Horticulture is one of the fastest growing sectors in Uganda and is listed as a strategic export in the Uganda strategic export programme. Horticulture exports are worth US $ 35 million per year (MAAIF 2019).Uganda is currently the second largest producer of fresh fruits and vegetables in sub-Saharan Africa after Nigeria producing about 1.1 million tons per year (MAAIF 2019). Exports in Uganda's horticulture sector have grown substantially over the last decade. An exporting company buys 1000fruits one week from a group of farmers in Kayunga district (Wakijira, 2010) with around 4000-5000 pineapples are bought per day in the pineapple season. There is a scope for horticulture to alleviate poverty in rural area both via producer participation activities as well as farm employment and value addition activities (MAAIF, 2019)

1.1.1 Pineapple production in Uganda

Pineapple (*abnanascomosus*) is one of the most grown crops in Kayunga district and it is not fully exploited as a cash crop due to challenges along the market chain ((Namuwoza &Tushemerirwe, 2011).In Uganda pineapples are grown in every district but on small scale. Kayunga district is the leading pineapple growing district in Uganda followed by Luweero district, Iganga district, Tororo district and Kamuli districts respectively. Uganda was ranked number 205 on the list for world pineapple production with nearly 800,000 tonnes produced annually in 2014.

Pineapple is the third most important tropical fruit in the world after banana (*Musa spp*) and citrus (Esiobu & Nwosu, 2014).Important pineapple producing countries are India, Brazil, China, Mexico and Colombia. They produce primarily for fresh fruit markets and processing industries. Uganda is ranked 205 on the list for world pineapple production with nearly 800.000 tones produced annually (Esiobu & Nwosu, 2014). Its content makes it a good raw material in confectionary industries for making sweets, fruit drinks and household food additives (Namuwoza and Tushemerirwe, 2011). It has medicinal value and consumption of pineapple juice adds one's immunity. Pineapple is used mainly as food in the form of snacks and fruit juices, while in most parts of the world the fermented juice is used to make vinegar and alcoholic spirits. Pineapple leaves are used to make clothes and ropes while the whole plant is used as a source of energy (Namuwoza and Tushemerirwe, 2011).However, despite the nutritional and commercial value of pineapple its production remains low in Uganda when compared to other nations of the world (Namuwoza &Tushemerirwe, 2011).

1.1.2 Post-Harvest Losses of Pineapples

The term Post-Harvest Losses (PHL) refers to measurable quantitative and qualitative food losses in the post-harvest system (De Lucia and Assennato, 1994). The system comprises of interconnected activities from the time of harvest through crop processing, marketing and food production to the final decision by consumer to eat or discard the food (Kaplisnky, 2012).Post-Harvest Losses are extremely high in the first and vegetable production sector and are estimated between 5% and 50% in the tropics and sub-tropics (Mrema& Rolle, 2012).

1.1.3 Contribution of Pineapples in developing countries

Uganda is one of the developing countries benefiting from the growing global organic market through export of organic fruits like pineapples. Uganda has the second largest number of certified farmers in the world, after India and has the largest area under organic agriculture in Africa (Willer*etal.*, 20l4).The national share of organic land to the total arable land in the country is 1.43%. Although the sector is small, its growth is impressive. For instance the total agricultural land in Uganda under certified organic production increased by 14.7% between 2005 and 2011, and the value of the organic exports also increased from US $ 4-6 million in 2003 to US $ 36.9 million in 2010 (Namuwoza &Tushemerirwe, 2011). Fruits are the third most exported organic products in terms of volume after coffee and cotton, organic pineapples makes

75% of the organic fruits exported. The organic pineapple export subsector has the capacity to thrive in Uganda because of the fairly fertile soils, the tropical climate and the history of less use of inorganic chemicals (Agro Eco & Grolink, 2008) (Willer *at al*, 2014) indicated that organic agriculture required less financial input and relies more on available natural and human resources which can be afforded by the small holder farmers.

1.2 Statement of the Problem

Post-harvest losses occur along the pineapple supply due to limited resources such as post-harvest technology, knowledge and infrastructure. Pineapples are highly perishable with some estimates suggesting a post-harvest loss of 30 to 50% in Uganda (MAAIF, 2019). The main causes of postharvest losses include mechanical damage, physiological deterioration and biological deterioration (i.e., postharvest diseases and insect pests) Chiejina, 2012*)*. In some cases, postharvest losses of pineapples are also attributed to socioeconomic and institutional factors, inadequate marketing information and support systems, inappropriate transportation facilities, unfavorable government policies, inability to implement regulations and legislations, lack of appropriate tools and equipment, lack of technical know-how and poor maintenance culture for existing facilities and infrastructure (Chiejina, 2012).

Despite the fact that the factors contributing to post- harvest losses in pineapples have been found elsewhere; there is limited empirical knowledge in the Ugandan context in the factors driving post-harvest losses of pineapple production. Additionally, the implication of such losses on the pineapple farm level profitability has not been studied in Kayunga district. It is imperative to undertake this study because investigating the effects of post-harvest losses of pineapple would be important. Also, little is known on the magnitude and value of post-harvest losses of pineapples in Kayunga district, this motivates the researcher to conduct research in the district

1.3 Objectives of the Study
1.3.1 General Objective
The general objective of the study is to assess the causes and impact of post-harvest losses of pineapples on farmers' profits in Nazigo Subcounty Kayunga district

1.3.2 Objectives of the Study

The specific objectives of the study are;

i. To find out the characteristics of pineapple growers in Nazigo Subcounty Kayunga district.

ii. To determine the major causes of postharvest losses among pineapples growers in Kayunga district.

iii. To estimate the loss in income of farmers as a result of postharvest losses in pineapples farmers in Kayunga district.

iv. To determine factors affecting postharvest economic losses among pineapple farmers

1.4 Research Questions

The following are the research questions of the study;

1. What are the characteristic of pineapple growers in Nazigo Subcounty Kayunga district?

2. What are the major causes of postharvest losses among pineapples growers in Kayunga district?

3. To what extent has the loss in income of farmers a result of postharvest losses in pineapples among farmers in Kayunga district?

1.5 Significance of the Study

The study findings were expected to be useful in the following ways:

The findings of the study may equip the farming community in Kayunga district with diverse knowledge on pineapple production.

The finding of the study will equip pineapple growers with better skills in post-harvest handling of pineapples and this will help to reduce losses hence increase their incomes.

Identifying the effects of post-harvest losses among farmers may enable the policy makers to realize the need to allocate more funds to farmers who participate to agriculture in Uganda most especially in rural areas to boost on pineapple production.

The study findings will help the policy makers in the implementation and designing of policies that will help enhance pineapple production in Kayunga

CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

Literature review is an overview of the previously published works on a specific topic. First a researcher cannot conduct the study without gaining a deep understanding of the research topic and learning from the work of other scholars and researchers in the field.

On the other hand literature review shows the researcher the results of that are already related to the study being reported and also provides a framework for establishing the importance of the study as well as a benchmark for comparing results of the study with other findings. Therefore, this chapter presents theoretical review and the review of existing literature from journals, magazines, reports textbooks, internet, and journals. This is done in accordance to the objectives. It is presented according to the themes derived from the objectives of the study that are described in chapter one.

This chapter presents the review of the existing literature from journals, magazines, text books, internet and newspapers. This is done in accordance to the objectives which include major causes of postharvest losses among pineapples growers, the loss in income of farmers as a result of postharvest losses in pineapples and factors that influence the magnitude of income reduction due to postharvest faced by the farmers.

2.2 Major causes of postharvest losses among pineapples growers

Post-harvest losses according toKitinoja and Kader (2011), are classified into three main categories; quantitative loss, qualitative loss, and economic or commercial loss. Others classified as direct and indirect losses in pineapples. Quantitative loss indicates the reduction in physical weight, and can be readily quantified and valued, example pineapple attacked by pests or lost during transportation. A qualitative loss is contamination of pineapples and includes loss in nutritional quality, edibility, consumer acceptability of the pineapples (Kitinoja& Kader, 2011). Economic loss is the reduction in monetary value of the product due to a reduction in quality and or/ quantity.

The main causes of postharvest losses in pineapples include diseases and insect pests *(*Chiejina, 2012*).* Rodents and birds also cause postharvest losses, especially in fruits such as pineapples

such losses tend to cause heavy losses among the pineapple farmers due to rough handling, and quality losses caused by temperature stress*(Chiejina, 2012)*. In some cases, postharvest losses in pineapples are also attributed to socioeconomic and institutional factors, inadequate marketing information and support systems, inappropriate transportation facilities, unfavorable government policies, inability to implement regulations and legislations, lack of appropriate tools and equipment, lack of technical know-how and poor maintenance culture for existing facilities and infrastructure *(Chiejina, 2012)*. In most developing countries such as Uganda, roads are not adequate for proper transport of horticultural crops, while transport vehicles and other modes, especially those suited for fresh horticultural perishables, are in short supply. Moreover, the extent of losses is significantly influenced by preharvest conditions and field operations such as cultivar and soil types, crop management practices, poor weather conditions, insect pest control programs and harvesting as well as handling practices *(Chiejina, 2012)*.

Moreover, postharvest losses vary greatly with commodities, production areas and seasons as well as the level of development of infrastructure and technology for postharvest management and market system (Bamishaiye, 2010*)*. Pineapple postharvest loss in Uganda could be as high as 40% and this is attributed to limited market for pineapples. However, quantitative and qualitative assessment information of postharvest losses of pineapples in Uganda remains scarce and is mostly based on guess estimates as opposed to formal quantitative field surveys *(*Bamishaiye, 2010*)*.Despite the rich knowledge of postharvest losses in pineapple production and marketing in the world, there is huge knowledge gap in postharvest handling and management in Uganda concerning pineapples. The extent of losses is also not known with reasonable accuracy. There exists only little recent quantitative and systematic evidence on the magnitude of postharvest losses in pineapples production and marketing in Uganda (Bamishaiye, 2010*)*.

2.3 The loss in income of farmers as a result of postharvest losses in pineapples

Postharvest losses can occur at any stage in the production and marketing chain. It is estimated that these losses due to inadequate postharvest handling, transportation and storage in pineapples in developing countries like Uganda is relatively higher, 20-50% in developing countries when compared to 5-25% in developed countries (Kader, 2009). This is in line with the current findings which discovered that 56% of this study. In some African countries it has been estimated that about 30% of produce is lost, and this figure can rise to 50% for very perishable

foods such as pineapples (Kader, 2009). These losses have several implications to the producers, retailers and consumers on their incomes.

Post-harvest losses can be measured both by quality and quantity losses. The losses can appear in any stage of the supply chain during activities such as harvesting, transportation, packing and at market places (Hodges *et al.,* 2011). The qualitative losses are foremost due to biological deteriorationincluding water stress, mechanical injuries, respiration rate, compositional changes and many more (Kader, 2009). These are often the effect of environmental factors such as temperature, humidity, sanitary factors and the concentration of ethylene, carbon dioxide and oxygen. The qualitative losses are more complicated to measure, but the quantitative losses are of greater importance to measure in developing countries (Kitonja, 2010).

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2.4 OVERVIEW OF COMMON HORTICULTURE MARKETING CHANNEL IN UGANDA

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                        ┌─────────────────────────┐
                        │ Input suppliers         │
                        └─────────────────────────┘
                                     │
                                     ▼
              A         ┌─────────────────────────┐
                        │ Horticulture producers  │
  ┌───────────────┐     └─────────────────────────┘
  │ Distributors  │◀────          │  B    Agents   C
  └───────────────┘               ▼                ▼
         │            ┌──────────────────────────────┐
         ▼            │ Exporters, processing,       │
  ┌───────────────┐   │ packaging, storage and       │──┐
  │ Wholesalers   │   │ transportation               │  │
  └───────────────┘   └──────────────────────────────┘  │
         │                       │                       ▼
         ▼                       │        ┌──────────────────────────┐
  ┌───────────────┐              │        │ Wholesale markets,       │
  │ Retailers     │              │        │ supermarkets and         │
  └───────────────┘              │        │ consolidating companies  │
         │                       │        └──────────────────────────┘
         │                       │                       │
         ▼                       ▼                       ▼
  ┌───────────────┐   ┌───────────────────┐   ┌──────────────────────┐
  │ Local         │   │ Regional          │   │ Overseas consumers   │
  │ Consumers     │   │ consumers         │   └──────────────────────┘
  └───────────────┘   └───────────────────┘
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Source: the horticulture sector of Uganda 2015
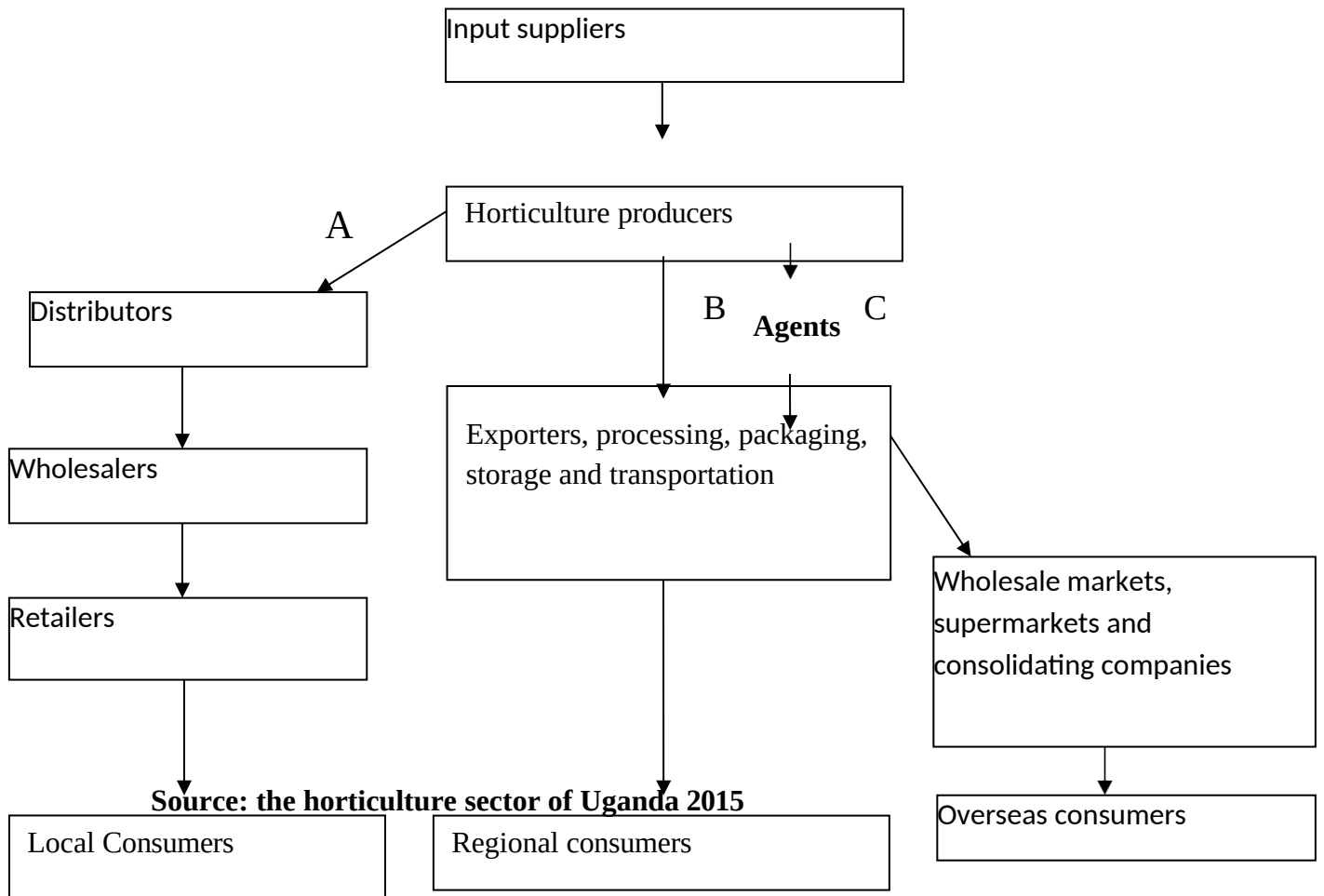
A: main channel for fruits and vegetables

B: channel for some fruits and vegetables and exclusive channel for commercial flower grower

CHAPTER THREE
METHODOLOGY

3.1 Description of the Study Area

The study was carried out in Nazigo Subcounty Kayunga district. Nazigo Subcounty Kayunga district was chosen because the residents depended on pineapple growing as their major farming activity as compared to other areas where farmers grow other crops *(Kayunga District*Local Government Report, 2014).

The Sub-country has warm and wet climate with relatively high humidity Crops grown include cassava, maize, Irish potatoes, sweet potatoes, beans, onions, tomatoes and cabbages. Nazigo sub-county has fertile soils that have enabled continuous growing of pineapples. Its topography is gently slope area at an elevation of 200 m or less. It vegetation is undisturbed by humans in its growth is controlled by the climatic conditions which has favorably allowed agriculture. However, the Sub-county is faced with a lot of challenges which include limited government funding, high rates of crime, unemployment and poverty among many others (Kayunga District Local government report, 2018).

3.2 Research Design

This study used a cross sectional design. The cross-sectional design is a research design by which the whole population or its subset is studied by seeking information about a study problem on what is going on at only one point in time (Camm, 2018). The cross- sectional design was used because cross sectional studies are generally fast and can be cheaply carried out because data collection does not take a long time. The design enabled qualitative and quantitative data analysis of the variables under the study. It helped the researcher to obtain information in the shortest period of time. With cross-sectional design, the researcher collected data quickly and cheaply. Both quantitative and qualitative data was used because they complemented each other. The study adopted both quantitative and qualitative means of data collections; Quantitative research methods permitted use of statistical analysis of numeric data, while qualitative research method is based on theories that explained the relationship of one variable with another variable. Acquisition of more in-depth information through interaction with the respondents was also done. Extensive observation and note-taking during interviews and respondents meetings was done in order to get data that was used in writing final report.

3.3 Sampling and Sample Selection

A sample size was used because this is where a sub-set of the total population is used to give the general views of the target population (Kothari, 2004).The sample size must be a representative of the population on which the researcher would wish to generalize the research findings. The population under study will comprise of 72 pineapple farmers in Nazigo Subcounty Kayunga district

Primary data was collected using structured questionnaires involving interviews with pineapple farmers.

3.4 Sources of Data

3.4.1 Qualitative data

This study used qualitative data because it was aimed at obtaining data expressed in non-numerical terms. Qualitative data provided ways of discerning, examining, comparing and contrasting, and interpreting meaningful patterns or themes. Qualitative data involved examining the assembled relevant data to determine how research questions were answered. Under this key informant interviews were conducted with pineapple farmers in the area.

3.4.2 Quantitative data

Quantitative data analysis helped to analyze and categorize detain terms of frequencies and percentages. Simple descriptive tabulations were for quantitative analysis. This was important in determining trends and interpreting research findings. Conclusions and recommendations were then drawn to satisfy the research questions. This study surveyed a large number of individuals and applied statistical techniques to recognize overall patterns in the relations of processes**.** A questionnaire was designed by the researcher in collecting data from the field.

3.5 Tools for data collection

3.5.1 Questionnaire

Questionnaire was the main tool for data collection and it had both open and closed ended questions based on a set of questions in relation to the study objectives which were administered to pineapple farmers in order to get the required data. The questions required response back up by a free consent of the respondents in the field.

3.5.2 Document Analysis

The researcher reviewed records, reports plus other detailed materials to obtain additional data. The technique was preferred because of its' flexibility and ability to provide supplementary information which helped in producing qualitative information. This involved reading more books, journals, reports, dissertations and articles.

3.6 Data Analysis

o **Data Analysis**

Stata software version 16 was used for analysis of the report and excel. data about farmers was cleaned and coded before analyzing. Data was coded for completeness, and processed using computer software called the Statistical Package for Social Scientists (SPSS). This was used to analyze quantitative data. This is chosen because it is able to compute all the statistical quantities that are required for the interpretation of the data that will be collected from the field by the researcher.

Objective 1

The data collected characteristics from the sampled pineapple farmers, was summarized, and was analyzed using descriptive statistics, frequencies, mean and percentages. Descriptive Statistics was used to present data collected from the field in a quantitative manageable form. Descriptive statistics therefore enabled the researcher to present collected data in a more meaningful way which allowed simpler interpretation of the data.

Objective 2

To analyze data for objective two that is; to determine major causes of post-harvest losses among pineapple growers. Each farmer was assigned to a major cause with the respective quantity lost. This was presented and summarized in the frequency distribution table

Objective three

To analyze the data for objective three that is; to estimate the reduction in income as a result of post-harvest losses. Descriptive statistics inform of frequencies and percentages was used to present the results. each pineapple lost was valued at mean price of 1000= to account for economic loss.

Objective   e   four

Regression analysis

This was to regress post-harvest losses against causes of loss and social economic characteristics of farmers. This studies the marginal effect of each factor on the quantity of losses with the aid of ordinary least squares

To determine factors affecting post-harvest losses among pineapple farmers. An ordinary least squares regression was done as follows

$$y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 \ldots \ldots \ldots \beta_{10} X_{10} + \varepsilon$$

Where

Y=postharvest economic losses of farmers in shillings

X1=age of farmer in years

X2=gender of farmer (male=1, female=0)

X3=education level of farmer (number of years in school)

X4=farm size in acres

X5=experience of farmers in years

X6 =marital status(married=0,otherwise=0)

X7=perishability (yes=0,no=0)

X8=poor handling (yes=1,no=0)

X7=weather (yes=1,no=0)

 X8= theft(yes=1,no=0)

B0=intercept

CHAPTER FOUR

RESULTS AND DISCUSSION

The chapter presents an assessment of effects of post-harvest losses of pineapples on farmers' profits in Nazigo sub county Kayunga district. These predictors and determinants include age, education level, gender,

4.1 Socio-economic characteristics of sample of pineapple farmers.

4.1.1 Age of the farmer

From the table 1 below, 20% of farmers are youth with the age below 35 years and 36% of farmers are adults with age above 45 years (table 1). This means 44% of the farmers are above 45 years. The average age of farmers is 46, This could be true since people look at this business to be for the people who have already established themselves in or accumulated enough income from other sources of activities. Young people may lack land and enough capital to venture into the business

Table 1: Age of pineapple farmers in Nazigo County

Age of farmers	Frequency	%
Youth (35 years and below)	10	20
31-55 years	18	36
Above 45years	22	44

4.1.2 Gender of the farmer

A slight majority (28%) of farmers who are female and 72% of farmers are male. This business is seen as a home business to supplement home income. This business requires patience which behavior, character, investment, land ownership which is among men that is why a big portion are male.

Table 2:gender of pineapple farmers in

Gender of the farmer	Frequency	%
Male	52	72
Female	20	28
Total	72	100.0

4.1.3 Education level of farmers

The study showed that 4% of farmers had no level of education. 22% of the farmers had only attained primary level. Most farmers (about 40%) of total farmers had attained secondary education and at least 34% of farmers had degrees and diplomas(table3). This is because the owner of this business is seen as for people who are not educated and they use this business to as employment. The study showed that 74% of farmers have spent at least 8 years in school and 26% of farmers have spent 1ess than 8 years in school.

Table 3: Education level of pineapple farmers in Kayunga District

Level of education	Frequency	%
none	3	4
Primary	16	22
Secondary	29	40
Tertiary	24	34

4.1.4 Main source of funds

Farmers require big investment to start pineapple farming. approximately18% of farmers got capital from Sacco's, The highest number of farmers started their farming business used personal savings, about more than half (54%)of Farmers depended on their own income. Only 16% of the total farmers started farming business-using loans. Loan is the second to personal saving as a source of income.

Table 4: Main source of funds for pineapple farmers in Kayunga District

Source of income	frequency	percentage
Sacco's	13	18
Group business	8	12
loan	12	16
Personal savings	39	54

4.1.5 Marital status

Most farmers were married meaning they depended on family labour. Over 82% of the farmer's families and only 18% of farmers are not married refer to table2. This is confirmed by the average age of farmers

	frequency	percentage
male	59	82
single	13	18

4.1.6 farm size

The study showed that 26% of farmers are small holder farmers who own not more than one acreage. At least 52 % of farmers did not own more than 5 acreages. This means more than half of the farmers own less than 5 acres of land. Only 10% of the total farmers in Nazigo sub county Kayunga grow on more than 10 acres. This shows that most farmers are smallholder farmers. On average farmers grow on 4.7 acres of land

acres	frequency	percentage
0-1	19	26%
2-5	30	42%
5-10	16	22%
11-20	7	10%

4.1.7 Transport

At least more than half (50%) of farmers use means of transport to sell their pineapples. only 44% of total farmers sell their pineapples from the farm gate. Those who sell their produces away from farmer use trucks and motorcycles. Since pineapple is a perishable fruit, farmers need to transport pineapple in time to final consumers that is why at least 44% of farmers use trucks to travel long distances to sell their pineapples

means	frequency	percentage
0	32	44
bicycle	2	4
Motor cycle	6	8
Truck	32	44

4.1.8 Experience

Since the average age is 46 years, this means most farmers have spent less than 5 years in the business that is 56% of farmers. only 4% of the farmers have spent more than 20 years in farming about 32% of the farmers have spent between 5 to 10 years in business. The average age of years of experience is 6 years

| years	frequency	percentage
1-5	40	56
6-10	23	32
11-20	6	8
21-25	3	4

4.1.9 Marketing

The table below shows 42% of the farmers sell their pineapples from the farm gate since they do not have any means of transport. About 28% of the farmers export their pineapples. Only 2 %of farmers sell to their pineapples to wholesalers

Market	frequency	percentage
City market	10	14
export	20	28
Farm gate	30	42
Village market	10	14
Wholesaler	2	2

4.2 Causes of losses and economic loss

A graph showing proportion of postharvest losses by different causes
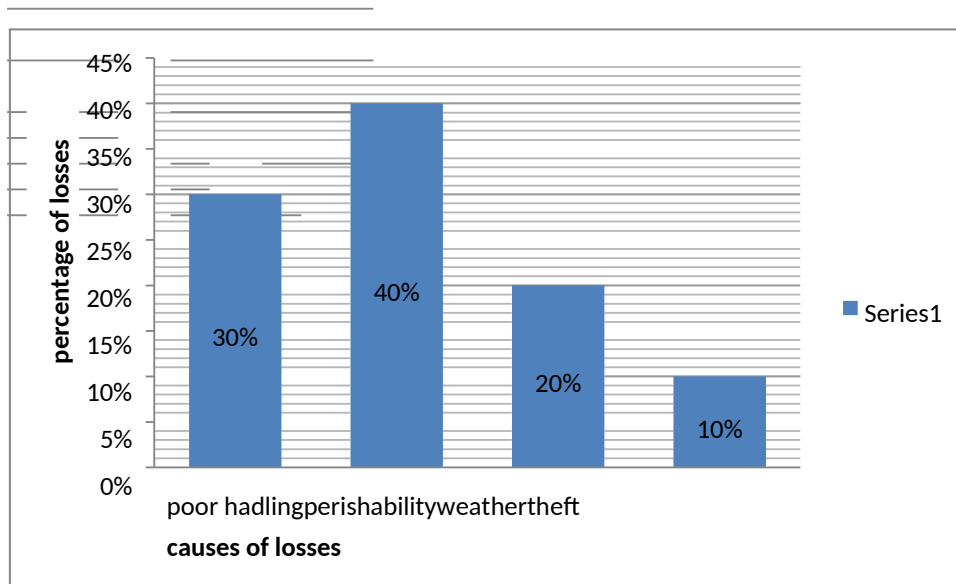
From the above graph perishability is the most serious cause of losses to farmers. this is attributed to delays during transportation and of ready market which causes losses of pineapples since they have a short shelf life which makes its storage a problem.

Poor handling of pineapples during harvest is a problem. The poor handling during harvest and transit causes losses. Some farmers fail to choose armature pineapple and harvest raw ones which is not sold.

Weather is another cause of losses. The weather patterns are changing very fast like unplanned prolonged droughts affect the size and appearance of pineapple which affect quality.

The other serious cause is due to the theft and damages from animals, these losses normally account to 10% of the total production

4.3 estimation of the loss in income to farmers as a result of postharvest losses of pineapples.

Table showing Distribution of loss in income as a result of the postharvest losses of pineapples to farmers

Cause	Quantity lost	Economic loss
Handling	51045	51,045,000
market	68060	68,060,000
heat	34030	34,030,000
theft	17015	17,015,000

Considering the total loss in income of the surveyed farmers. Lack of marketing causes about 68,060,000/- loss in income because of delays which make pineapples to rot before being taken by consumers, this is followed by poor handling of pineapples which costs farmers 51,045,000/- Theft is the least factor in causing loss in income of farmers

4.3 Determinants of losses among farmers.

According to the table below natural quantity of losses is regressed against causes and social economic characteristics factors. The results showed only theft among the causes of losses was not significant. gender, education level of experience of a farmer, marital status and transport were the significant social economic characteristics. all the three causes of losses were also significant. Farmers who suffered losses due to poor handling lost 56 pineapples less compared to other farmers who suffered losses due to other causes. Farmers who lost pineapples due to perishability lost 51 pineapples compared to farmers who lost pineapples due to other losses

Quantity lost	Coefficient	P-value	Significant
age	.3709461	0.690	Not significant
Gender(male=0,female=1)	82.79162	0.010	significant

Education(years spent in school)	-6.007547	0.081	significant
Farm size (acres)	14.44912	0.002	significant
Marital status(married=1,single=0)	-61.28103	0.002	significant
weather	-86.14835	0.000	significant
theft	4.104062	0.619	Not significant
Poor handling	-56.71078	0.063	significant
transport	-14.32634	0.281	Not significant
perishability	51.84369	0.003	significant
constant	268.6754	0.000	

R-squared=0.65

Adjusted-squared=0.59

CHAPTER FIVE

5.0 RECOMMENDATIONS AND CONCLUSION

5.1 Conclusion
5.1.1 Social economic characteristics
According to the results we conclude that the average age of farmers is 46 and that 44% of the farmers are above 45 years. The business is mostly composed of men who have enough land or rights to land and a few females who can that is only 38%. Most farmers about 40% of total farmers had attained secondary education and at least 34% of farmers had degrees and diplomas. This shows that at least the farmers are literate and 26% only of farmers have spent 1ess than 8 years in school. The highest number of farmers start their farming business using personal savings, about more than half 54% of Farmers depend on their own income. Only 16% of the total farmers   start farming business-using loans. .82% of the farmer have families or married and only 18% of total farmers are not married.

5.1.2 Major causes of postharvest losses on pineapples in Nazigo Subcounty Kayunga district.
From the results obtained from the analysis the most significant cases of postharvest losses were perishability. There is a problem of market since all farmers harvest in the same period and the demand for pineapples is inelastic leading to the delay in consumption. The other causes of post-harvest losses were poor handling at 30%, heat at 20% and theft. The poor handling was due to poor transport and storage facilities. Heat is caused by unpredictable weather changes.

5.1.3 The loss in income to pineapple farmers in Nazigo Subcounty Kayunga district
The total impact of the losses on the farmer's income is 16%. Meaning the proportion of quantity lost on the quantity harvested is 16%.at least before selling to final consumer 16% is lost.

5.1.4 Other factors determining postharvest losses on pineapples to farmers in Nazigo Subcounty Kayunga district.
Other than weather changes and farm characteristics like lack of equipment the other only farmer characteristics influencing losses is age and experience. This is true since elder farmers and farmers with experience handle pineapples more carefully than younger ones and inexperienced farmers.

5.2 Recommendation

The government should introduce credit facilities and strengthen other finance interventions to encourage farmers buy or setup better storage facilities to prevent postharvest losses

The government should help farmers look for market in other countries to export to other countries to address lack of market constraints

The farmers should encourage irrigation systems to enable farmers produce through out the year to control price fluctuations.

The government should put policies to attract foreign investors to establish industries which can buy pineapples and add value on the pineapples to solve the problem of marketing

The farmers should be encouraged to form farmers cooperatives to export pineapples, transport pineapples and also to acquire loans at low interest rate

The government should form policies to advocate women empowerment like land ownership to enable them to join agriculture.

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