IMPACT OF TRANSACTION COSTS ON SMALLHOLDER FARMERS OF POTATOES PRODUCTION IN TANZANIA: A CASE STUDY OF KIGAMBONI COUNCIL

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CERTIFICATION

The undersigned certify that he has read and hereby recommend for acceptance by The Open University of Tanzania a dissertation titled: ***Impact of Transaction Costs on Smallholder Farmers of Potatoes Production in Tanzania: A Case Study of Kigamboni Council,*** in fulfillment of the requirements for the Degree of Maters of Economics of the Open University of Tanzania**.**

……

Timothy Lyanga

(Supervisor)

……

Date

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DECLARATION

I, **Shaaban S. Onga**, declare that the work presented in this dissertation is original. It has never been presented to any other University or Institution. Where other people's works have been used, references have been provided. It is in this regard that I declare this work as original mine. It is hereby presented in partial fulfilment of the requirement for the Degree of Master of Science in Economics (MSc-Econ.).

……..……

Signature

…….

Date

DEDICATION

I dedicate this dissertation to the individuals who have played an invaluable role in my academic journey, offering unwavering support, encouragement, and inspiration. To my Wife Amina Warisanga, My Children Salma, Sameer and Sallah whose love and belief in me have been constant sources of strength throughout this challenging endeavor. Your unwavering support and sacrifices have made this achievement possible, and I am forever grateful.

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Finally, to all those whose names cannot be mentioned but whose impact on my life has been profound, thank you. Your belief in my abilities, words of encouragement, and acts of kindness have fuelled my determination and resilience.

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ABSTRACT

The study aimed to assess the impact of transaction costs on smallholder farmers involved in potato production in Tanzania: A case study of Kigamboni. The study used cross sectional research. The study applied the purposive sampling technique to select a sample size of 96 smallholder farmers. A descriptive analysis and inferential analysis were employed in the data analysis. Findings showed that input costs, and risk associated have statistical negative significant, while financial support has a statistical positive significant. Also, findings showed that input costs such as the amount used to hire land, buy fertilizer, buy seeds, hire labour, pay for transportation of inputs, and pay for transportation of harvests affect potato production. Also, findings show that unaffordable loan collateral, a high interest rate from the lender, a short loan repayment period, and short total days spent processing credit affect smallholder farmers in potato production. Moreover, the findings reveal that rainfall variations, diseases, accidental fire, unstable prices in the market, and long harvesting times are the most prevalent risks in potato production. The study suggests that smallholder farmers could benefit from government help in the form of input cost reduction subsidies. Programmes for crop insurance must also be implemented in order to shield farmers from the hazards involved in producing potatoes. Additionally, granting them financing through alliances with banks, non-governmental organisations, and government initiatives can assist them in purchasing inputs and paying for additional production expenses.

Keywords: *Smallholder Farmers, Transaction Costs, Potatoes, Production*.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

FAO	Food and Agriculture Organization
SPSS	Statistical Package for the Social Sciences

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Potatoes are currently grown on an estimated 19 million hectares of farmland globally, and potato production worldwide stands at 378 million tons. The highest concentrations are found in the temperate zone of the northern hemisphere, where the crop is grown in the summer during the frost-free period. In these regions, potatoes are mainly grown as a cash crop and are therefore an important source of income. Potatoes are mainly grown as a cash crop and are therefore an important source of income (Campos & Ortiz, 2020).

According to FAO data, a total of 376 million metric tons of potatoes were produced worldwide in 2021, with China (94 million metric tons) and India (54 million metric tons) as the largest potato-producing countries (FAOSTAT, 2022). Global statistics also indicate that potato production is shifting towards developing countries, especially with the strong increase in production in Asia and Africa, especially in East Africa (Nagel et al., 2022).

Africa has registered large increases in harvested area over the last 20 years, but despite the impressive growth, total production and harvested areas are still much smaller compared to Europe and Asia. In Africa, the increase in potato production has largely been due to an increase in the area under production, which has more than doubled since 1994 and now exceeds that of the Latin America and Caribbean region (Campos & Ortiz, 2020).

In Sub-Saharan Africa, most potatoes are produced in Eastern Africa (71%), while Southern and West Africa account for 21% and 8% of the total production, respectively (Muthoni & Shimelis, 2023). In the tropical highlands of East Africa, farmers grow potatoes both for food and cash (Muthoni et al., 2010). The increase in potato production in East African countries over the last few years has been impressive, suggesting a higher contribution of the crop to local food systems (Campos & Ortiz, 2020).

In Tanzania, the total area planted with potatoes is 170.000 ha per year. In total, there are 28 Tanzanian districts where potatoes are grown. These all have highland ecologies and account for 90% of the country's total potato production. Of these districts, thirteen are located in the southern Highland agro-ecological zone and nine in the northern zone. The key production areas in Tanzania, including the Iringa, Njombe, and Mbeya regions (Netherlands Enterprise Agency, 2017).

Most of the farmers that cultivate potatoes in the Southern Highlands are small, ranging from 0.4 to 10 acres. One interview with farmers in this range showed that small farmers have lower yields per acre (per harvest season): while a farmer with 0.4 acres produces 12.5 tons/ha, a farmer with 4 acres produces 15 tons/ha, and a farmer with 20 acres can produce 20 tons/ha. Another interview indicated that the average production of a farmer ranges between 10 and 25 tons per hectare. The difference in yield is mainly explained by the capacity of farmers to invest in adequate inputs. Most of these farmers do not apply the required inputs due to transaction costs (Campos & Ortiz, 2020).

However, relationship between transaction costs and agricultural productivity is very serious. High transaction costs can reduce agricultural productivity by increasing the costs of inputs and reducing the profitability of output sales (Cuevas, 2014). For example, if smallholder farmers in a remote area face high transaction costs in accessing input markets, they are forced to use lower-quality inputs (such as land, fertilizer, pesticides, seeds, and transportation) or pay higher prices, which reduces crop productivity. Similarly, if farmers face high transaction costs in accessing output markets, they are forced to sell their crops at lower prices, which also reduces their profitability (Stifel & Minten, 2008).

On the other hand, reducing transaction costs can improve agricultural productivity by making it easier for smallholder farmers to access inputs, find buyers, and negotiate better prices. For example, if farmers have access to reliable information about input prices and suppliers, they may be able to reduce their transaction costs and purchase higher-quality inputs at lower prices, which can improve the productivity of their crops. Similarly, if farmers have access to reliable information about output prices and buyers, they can reduce their transaction costs, sell their crops at higher prices, and increase their profitability (Stifel & Minten, 2008).

Likewise, most smallholder farmers lack critical inputs that will unlock the gains in productivity and income that will lead to these economic and social development gains. Financing is central to smallholders' gaining access to these inputs. Yet, most smallholder farmers are also unable to access the financing they need to secure these inputs (Savoy, 2022).

1.2 Statement of the Problem

Potato production is an important source of employment and income for many smallholder farmers. However, for the farmers to get the desired production, it needs to be supported financially to enable smallholder farmers to reduce transaction costs from the farm gate to the market. High transaction costs in potato production reduce the productivity and profitability of smallholder farmers. In most developing economies, like Tanzania, smallholder farmers find it difficult to attain desired production because of the numerous constraints and barriers, mostly reflected in the transaction costs that make access to input and output markets difficult. Some of these barriers include high input costs, poor financial support, and the risk associated with potato production.

When assessing the impact of transaction costs on smallholder farmers in potato production, much attention has been accorded to large farmers while ignoring smallholder farmers who are also part of the production of potatoes. Furthermore, most studies (Nigussie, 2018) focused on researching the effect of transaction costs on market participation, while other studies (Kausar& Alam, 2016; Bombo, 2013) about the impact of transaction costs on smallholder farmers focused on other products, ignoring potato production, which is more perishable.

Therefore, these show there are insufficient reviews in the study about the impact of transaction costs on smallholder farmers. To fill the gap, this study assessed the impact of transaction costs on smallholder farmers' potato production in Tanzania: A case study of Kigamboni Council. By using field experience, most of the smallholder farmers of potatoes in Kigamboni do not benefit from farming activities compared to

the southern high zones of Tanzania, such as Mbeya because of transaction costs. Therefore, this area was selected to assess if the transaction costs accelerate or decelerate.

1.3 Research Objectives

1.3.1 General Research Objective

The general objective of this study was to assess the impact of transaction costs on smallholder farmers of potatoes production in Tanzania.

1.3.2 Specific Research Objective

i. To analyze the impact of input costs on smallholder farmers of potatoes production in Kigamboni,
ii. To Study the impact of financial support on smallholder farmers of potatoes production in Kigamboni,
iii. To determine the impact of risks associated with potatoes production on smallholder farmers in Kigamboni,

1.4 Research Hypothesis

i. Null Hypothesis: Input costs have no significant impact on smallholder farmers of potatoes production in Kigamboni.

   Alternative Hypothesis: Input costs has a significant impact on smallholder farmers of potatoes production in Kigamboni.

ii. Null Hypothesis: Financial support has no significant impact on smallholder farmers of potatoes production in Kigamboni.

   Alternative Hypothesis: Financial support has a significant impact on

smallholder farmers of potatoes production in Kigamboni

iii. Null Hypothesis: Risk associated has no significant impact on smallholder farmers of potatoes production in Kigamboni.

Alternative Hypothesis: Risk associated has a significant impact on smallholder farmers of potatoes production in Kigamboni.

1.5 Significance of the Study

The findings of the study could be used to inform policy decisions to support smallholder farmers in Kigamboni. For example, if the study finds that high transportation costs are a significant transaction cost for potato production, policymakers can consider investing in infrastructure improvements to reduce these costs. Through the findings of this research, the community can understand how transaction costs affect the productivity of the potatoes in Kigamboni. The study's findings can build a comprehensive understanding of the hindrances facing smallholder farmers in potato production. Understanding the input costs and risks associated with potato production can help farmers take early precautionary measures to minimize the severe impact of transaction costs. The research forms a base on which future research can be done by generating a gap in knowledge on the topic.

1.6 Scope of the Study

The study involved smallholder farmers from Kigamboni Municipal Council who participate in the production of potatoes. By using field experience, most of the smallholder farmers of potatoes in Kigamboni do not benefit from farming activities compared to the southern high zones of Tanzania, such as Mbeya. Therefore, this

area was selected to assess if the transaction costs accelerate or decelerate.

1.7 Limitation of the Study

Some respondents were not willing to participate in the study. First, to deal with this challenge, the researcher exhaustively explained the purpose of the study to be entirely for academic achievement and assured the participants of non-disclosure of identities. Due to resource constraints, the study was based on a relatively small sample size of potato farms. While the results provide insights into the practices and outcomes of these specific farms,Data were primarily collected through surveys and self-reporting, which might introduce potential biases due to respondents' subjectivity, recall errors, or social desirability bias.

1.8 Organization of the Study

This research is organized into six chapters where chapter one illustrates the background of the study, problem statement, objectives, research questions, significance, and the scope, and organization of the study. Also, chapter two covers a literature review which comprises theoretical and empirical reviews, while chapter three covers research methodology. Moreover, chapter four includes data analysis, and presentation of findings, while chapter five is the discussion of findings, and chapter six includes a summary of the findings, conclusions, recommendations, and areas for further research.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter gives reviews of the literature. It consists of definitions of key terms, theoretical review, empirical review, and conceptual framework.

2.2 Definition of Key Terms

This part defines key terms that were used in the study including the terms, production, input costs, financial support, and risks associated.

2.2.1 Production

Production is the act of creating or making anything out of parts or raw materials, or the process of being created. Also, production is defined as the process of mixing numerous inputs, both materials (like wood, glass, metal) and immaterial (like knowledge, plans) to make output (Sickles & Zelenyuk, 2019). Production in this study included production of potatoes.

2.2.2 Input Costs

Input cost is the set of costs incurred to create a product or service. Input costs include costs of crop protection chemicals, fertilizer, labor, and machinery(Iversen et al., 2020). Input costs in this study included land hiring, labour, fertilizer, pesticides, seeds, and transportation costs.

2.2.3 Financial Support

Financial support includes any guarantees, loans, funding, or Security securing obligations of another person or other financial assistance (whether contingent or

actual). Financial resources are provided to make some project possible (Peter et al., 2018). The financial support in this study included credit availability or funding support.

2.2.4 Risks Associated

In general risk refers to the probability of some undesirable event. Therefore, risks associated are those probability of some undesirable events that are linked to particular activities (Hails, 2002). Therefore, in this study risks associated included those risks that are linked with the production of potatoes.

2.2.5 Transaction Cost

Costs associated with buying or selling a good or services are known as transaction costs. The work involved in bringing a good or service to market is represented by transaction costs, giving rise to entire industries devoted to facilitating trades (DeMiguel et al., 2020).Economy becomes more efficient and more capital and labor are available to create wealth when transaction costs decline. A change of this magnitude requires the labor market to adapt to its new environment, which can be painful (Downey, 2023).

2.3 Theoretical Review

2.3.1 Transaction Cost Theory

British economist Ronald Coase first introduced the theory in 1937 to explain why economic organizations exist (Hennart, 2005). According to the transaction cost theory, any business or economic activity should aim to reduce transactional costs. Therefore, depending on transaction costs, the firm will decide whether to administer

the resources internally or externally. For instance, the theory predicts that when these costs are substantial, organizations will internalize the majority of transactional activity within hierarchies. On the other hand, if the expenses are minimal, businesses would prefer to outsource the task. It is because it would be less expensive to pay an outside party to complete the task (Chowdhury & Vaidya, 2023).

The theory's showed that in addition to the costs associated with the actual movement of goods from point A to point B, the exchange process itself is expensive due to the costs associated with gathering market data, negotiating contracts, monitoring, enforcing agreed-upon transactions, and marketing their produce (Mwagike, 2015). The theory is linked to the study as it is accounting for the actual cost of outsourcing production of products or services including transaction costs, and coordination costs.

The inclusion of all costs is considered when deciding and not just the market prices. Also, the theory accounts for the transportation costs, information costs, and input costs in the farming activities. High transportation and information costs influence farmers' decisions to rely on middlemen rather than sell directly to consumers, while high transaction costs to farmers on input accessibility and produce marketing prevent farmers from reaping the anticipated benefits because the profit received is less than the costs incurred (Mwagike&Mdoe, 2015).

2.4 Empirical Reviews

Ismail et al. (2015) in Mpwapwa and Kongwa districts in the Dodoma region, we

used a binary logistic regression model to analyze the transaction costs of the market participation decisions of maize smallholder farmers. The study showed that transaction costs have a significant influence on market participation behaviors. Andersson (1996) analysed technical aspects of potato cultivation in a particular area in Tanzania. In the study, he writes that without proper equipment, potatoes can be hard to manage: they are prone to disease and subject to tuber degeneration (Andersson 1996, 86). Booth and Burton wrote in 1983 in their article that for such a perishable crop like the potato, appropriate post-harvest technology (mainly cooling systems) is not only required to reduce food losses, but also to maintain the perishable planting material from one growing season to the next (Booth & Burton 1983, 275).

Jagwe (2011) studied the impact of transaction costs on smallholder farmers' and intermediaries' participation in the banana markets in Congo, Burundi, and Rwanda. According to the study's findings, fixed and proportionate transaction costs have a significant impact on smallholder farmers' ability to participate in market places. Being a member of farmer organizations makes it easier for people to communicate information, which lowers fixed transaction costs and enhances the possibility that farmers will engage in marketplaces. The size of the household, the gender of the household head, off-farm income, availability of price information, and the degree of distance of the household all had a substantial impact on the selling point decision.

Rutatola (2018) Kongwa District Council in Dodoma assessed the transaction costs of post-harvest maize value chain performance among maize smallholder farmers. The study used a survey research design with a sample of 88 respondents who were

selected via multiple stages of sampling. It was discovered that information costs were not a factor in the post-harvest maize value chain's performance, but transportation costs and middleman costs did have an impact on post-harvest profits, output sales, and post-harvest losses. Through the chi-square test, the performance of the post-harvest value chain was substantially correlated with the costs of transportation and middlemen but not with the cost of information.

Kausar and Alam (2016) in Bangladesh studied the transaction cost Analysis of maize marketing. The study identified five elements of transaction costs in the sale of maize, including information costs such as search and screening expenses and contracting costs such as bargaining, monitoring, and enforcement costs. The study discovered that the largest information costs were associated with screening expenses for the dependability of both buyer and seller, as well as for the quality of the maize and monitoring costs.

Bombo (2013) in Kilosa and Mvomero districts of the Morogoro region in Tanzania, analysed the marketing and production transaction costs of sugarcane out growers. The findings indicated that, in both study areas, the distance from the field to the factory is the only significant factor having a significant impact on transaction costs. Also, regression analysis was performed to look into how transaction costs affected sugarcane output and quality. The research found a negative relationship between transaction costs and quality level.

Baraka (2019) in Kenya, researchers studied the effects of transaction costs among smallholder vegetable farmers on their preferred market channel choice. The study

discovered that as farmers try to boost their income, different forms of transaction expenses have a major impact on them in both good and bad ways. Further research revealed a similar strong positive correlation, whereby smallholder farmers will pay greater transaction costs to increase their profitability. This demonstrates the need for efficient governance systems.

Nigussie (2018) investigated the effect of transaction costs on the participation of smallholder farmers in vegetable markets and on market channel choice decisions. Tobit regression analysis of the impact of transaction costs on household vegetable sales through brokers revealed that among the major predictors of farmers' vegetable sales through brokers are the condition of the road, bicycle ownership, and vegetable type. The study discovered that transaction costs in various forms affect smallholder farmers' decisions to participate in the vegetable market, the level of participation, market channel preferences, and farmers' use of brokers to sell vegetables in the Central Rift Valley of Ethiopia.

Antwi and Ohene-Yankyira (2017) The study looked at the effects of relationship lending on the transaction costs of maize farmers in Ghana's Ashanti and Brong Ahafo regions obtaining credit from financial institutions. The findings revealed that farmers' access to financial information, prompt repayment of loans when they become due, and having investments with banks have the potential to significantly reduce the transaction cost of obtaining credit. Keeping non-mandatory savings and increasing the number of years of dealing with the bank may also reduce the transaction cost of borrowing. However, dealing with multiple banks raises the farmer's transaction costs.

Assogba et al. (2017) studied the determinants of credit access by farmers in Benin's North East. Primary data were collected from 120 randomly selected and interviewed respondents using a structured questionnaire. According to the findings, the number of years of literacy, membership, guarantor, collateral, and interest rate all influence access to credit among smallholder farmers. Each additional year of schooling increased the likelihood of access to credit by 3.9 percent, while literacy in the local language increased the likelihood by 10.9 percent. Membership in farmers' cooperatives was found to increase the likelihood of credit access by 31%, while having a guarantor increases the likelihood of credit access by 18.9%. The availability of collateral, on the other hand, reduces the likelihood of credit access by 12.4 percent, while credit with high interest rates reduces it by 11.7 percent. Thus, governments and non-governmental organizations should promote education, literacy, and cooperative membership among farmers to improve rural farmers' access to credit.

2.5 Research Gap

Furthermore, (Nigussie, 2018) from the empirical reviews focused on researching the effect of transaction costs on market participation, while other studies (Kausar& Alam, 2016; Bombo, 2013) about the impact of transaction costs on smallholder farmers focused on other products, ignoring potato production. Therefore, there are insufficient reviews in the study about the impact of transaction costs on smallholder farmers. To fill the gap, this study is going to assess the impact of transaction costs on smallholder farmers' potato production in Tanzania: a case study of Kigamboni Council.

2.6 Conceptual Framework

In this study, input costs, financial support, and associated risk are the independent variables, while potato production is the dependent variable. The relationship is presented in Figure 2.1.

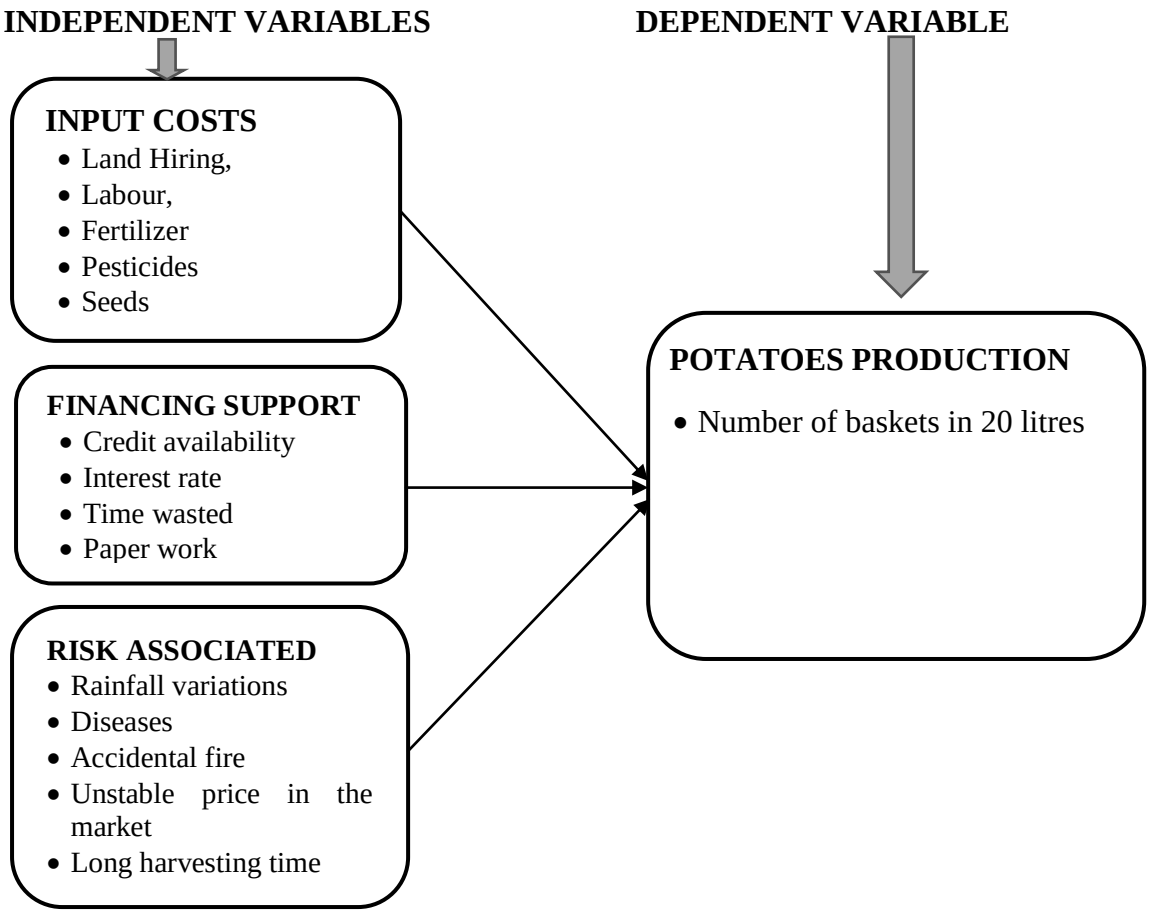


Figure 2.1: Conceptual Framework
Source: Researcher Conceptualization (2023).

Figure 2.1 shows the relationships between input costs where the costs of land hiring, labor, fertilizer, pesticides, and seeds determine potato production when the transaction costs are lower. Also, for smallholder farmers to increase productivity, the availability of credits is crucial. The financial institutions that have low interest

rates and affordable collateral influence smallholder farmers to get loans that can boost their production capacity. Also, the time it takes to access loans from financial institutions or the government due to bureaucratic procedures can be a barrier for smallholder farmers to finance their potato farming activities. Also, the risks associated with the farming activities, such as drought, excess rain, or fire hazards in the farm areas, are barriers to smallholder farmers' getting the desired output.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter displays the methodology which was used in conducting this research. It includes the research design, study area, population, types and data sources, sampling techniques, and sample size, methods of data collection, data analysis procedures, reliability, and validity of data, and ethical considerations.

3.2 Research Design

The study used cross sectional research design. In this research design**,** data is collected at a single point in time, which is helpful for both description and determining the link between variables. Therefore, it also help to test hypotheses about associations or relationships between variables, also to establishing baseline data that can be used in subsequent longitudinal or experimental studies. They provide a starting point for monitoring changes over time. By collecting data at a single point in time, they can assess whether a relationship exists between variables of interest.

3.3 Research Approach

The study used quantitative approach. The quantitative approach was selected because the study included quantitative data or data in form of numerals.

3.4 Study Area

The study was conducted in Kigamboni Municipal Council. By using field experience, most of the smallholder farmers of potatoes in Kigamboni do not benefit from farming activities compared to the southern high zones of Tanzania, such as

Mbeya. Therefore, this area was selected to assess if the transaction costs accelerate or decelerate.

3.5 Unit of Analysis

The unit of analysis is the particular entity or phenomenon being studied, which can be an individual, group, organization, community, society, or a specific event or process (Kothari & Garg, 2014). The unit of analysis in this study included smallholder farmers of potatoes in Kigamboni.

3.6 Study Population

As indicated by Kothari (2008) population is the total number of elements where the researcher expects to select a sample from it. Here, the study population included smallholder farmers of potatoes in Kigamboni.

3.7 Sample Size and Sample Design

3.7.1 Sample Size

The sample size of 96 participants from smallholder farmers of potatoes was used. The sample size has been attained through formula of Cochran. The sample size selection was due to financial and time factor. The formula of Cochran (1977) was selected to calculate population sample size. The formula is given by;

$n = \frac{z^2pq}{e^2}$, $n = \frac{(1.96)^2(0.5)(0.5)}{(0.1)^2}$ = 96.04 ~ 96, Where: n = Sample size, q = 1-p, z = confidence level, e = precision level = 0.1, p = population estimated attribute, p = 0.5, Z = 1.96 (95% C. level)

3.7.2 Sampling Design and Procedures

The study applied the purposive sampling technique in gathering respondents' responses. The purposive sampling entrusts the researcher with the decision on what item should be included or not based on the researcher's decision or judgment (Kothari, 2004). Since not all smallholder farmers are potatoes production, then the approach was fitting to include relevant smallholder farmers (smallholder farmers of potatoes) with experience in potatoes production.

3.8 Sources of Data

The study included primary sources of data. Primary data was gathered from the smallholder farmers of potatoes by closed 5 Likert scale questionnaire. The study used primary data because it is more reliable, accurate, comes from a direct source, and it is easily to be updated.

3.9 Variables and Measurements Procedures

Table 3.1 shows variables, and their measurements.

Table 3.1: Indicators and Measurement of Variables

Variable	Indicators	Measurement
Input costs	• Land Hiring, • Labour, • Fertilizer • Pesticides • Seeds • Transportation	Five-point Likert scale 1=Strongly Agree, 2=Agree, 3=Neutral, 4=Disagree, 5=Strongly Disagree
Financial Support	• Credit availability • Interest rate • Time wasted • Paper work	Five-point Likert scale 1=Strongly Agree, 2=Agree, 3=Neutral, 4=Disagree, 5=Strongly Disagree
Risks associated	• Rainfall variations • Diseases • Accidental fire • Unstable price in the market • Long harvesting time	
Potatoes Production	• Number of baskets in 20 litres	

Source: Researcher, (2023)

3.10 Methods of Data Collection

This research used a questionnaire with a closed questions technique to gather information. Likert scale questions were used in the questionnaire to get responses from the participants. The questionnaire technique was chosen as it gives participants enough time to think and fill the gap in questionnaires; further questionnaires keep privacy among the participants and embrace a large number of individuals. The research administered 96questionnaires to smallholder farmers of potatoes. The questionnaire had two main sections; the first section comprised multiple-choice questions about background information such as gender, age, and education level of the respondent, and farming experience, and the second section comprised five-Likert scale questions per objectives, and the third section comprised the trend of production of potatoes.

3.11 Data Processing and Analysis

The data was first be entered in SPSS, cleaned, and coded. Quantitative analysis both descriptive and inferential analysis were used in the analysis of data.

3.11.1 Descriptive Analysis

The descriptive data analysis involved presentation of the participants' responses in tables and graphs where frequencies and percentages were useful to indicate the level of participants' responses.

3.11.2 Inferential Analysis

The inferential analysis known as the multiple regression analysis was used. Since the regression analysis needs an interval or ratio scale of measurements, then, the

average of Likert scale data in each specific objective was calculated, and then, the average was used in regression analysis. The multiple regression model of this study is as follows;

Dependent variable = $\beta_0+\beta_1$Input Costs+$\beta_2$financial support+$\beta_3$risk associated + e

Where; e = Error term, β_0 = Constant, β_1,β_2 and β_3 = Coefficient of input costs, financial support, and risk associated respectively.

The estimated model becomes;

Potato Production = 1.181 - 0.018 (Input Costs) + 0.078 (Financial Support) - 0.011 (Risk Associated)

Moreover, the study has applied econometric tests (Diagnostic test) based on four assumptions of multiple regression. These diagnostic tests include normality test, multi-collinearity test, homoscedasticity of variance, and autocorrelation terms.

Normality test; This research will be applied Q-Q plots technique to determine whether the data was distributed or not. If the points in Q-Q plots will be located near the diagonal line indicating that the residual is normally distributed, and the assumption will be accepted.

Multi-Collinearity Test; The high multi-collinearity problem can increase the variance of the coefficient estimate. The diagnosis of a high multi-collinearity problem will be performed using values of Inflation factor (VIF) and Tolerance (1/VIF). The problem of multi - collinearity will be counted present when a tolerance value is less than 0.10 and the VIF is above 10.

Autocorrelation Terms; refers to the correlation degree between the same variables over two subsequent time periods. The test of Durbin-Watson will be used to test

autocorrelation. Durbin-Watson values must lie between 1.5 and 2.5 for the autocorrelation to be absent (Bence, 1995).

Homoscedasticity of Variance; It is the presumption that variations in the groups being examined are equivalent or similar. Because parametric statistical tests are sensitive to any differences, this is a crucial presumption. The simplest technique to determine homoscedasticity is to plot the residuals against the dependent variable in a scatterplot. A model will display heteroscedasticity if it contradicts homoscedasticity.

3.12 Reliability and Validity of data

3.12.1 Reliability

The study applied Cronbach's Alpha Coefficient to test the ability of the study instrument to give the desired results. Alpha of Cronbach was applied to measure the extent to which the Likert scale items measure the same basic feature. The suggested coefficient standard is 0.7, which shows that the amount of the scale is related to similar situations and items. This indicates that from 0.7 and above, the scale is counted to be reliable (George & Mallery, 2003). The following are several Cronbach Alpha guidelines, according to George and Mallery (2003).

> 0.9 = excellent, _> 0.8 = good, _> 0.7 = acceptable, _> 0.6 = questionable, _> 0.5 = Bad, and <0.5 = unacceptable.

Table 3.2: Reliability Statistics

Variables	Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
Input Costs	0.729	0.741	6
Financial Support	0.717	0.766	5
Risks Associated	0.715	0.733	5
Potato production Status	0.807	0.866	3

Source: Field data, (2023).

Table 3.2 shows that Cronbach's Alpha for input costs, financial support, risks associated, and potato production are 0.729, 0.717, 0.715, and 0.807 respectively. Therefore, items for financial support, risks associated, and potato production are considered acceptable because Cronbach's Alpha Coefficient is greater than 0.7.

3.12.2 Validity

To ensure the validity of the instrument for data collection the study employed a pilot test before data collection. A pilot test enabled the study to collect errors or omissions noted before the process of data collection starts.

3.13 Ethical Consideration

In data gathering, the researcher explained the objective of the study to the participants. In the process of conducting this study, the study ensured the voluntary participation of the participants. The study further assured the confidentiality of information to the study, where the names and personal information of the participants cannot be shared or written anywhere in the report.

CHAPTER FOUR

DATA ANALYSIS AND PRESENTATION OF FINDINGS

4.1 Introduction

This chapter presents the results per the objectives. The general objective of the research is to assess the impact of transaction costs on smallholder farmers of potato production in Tanzania. Specifically, the research aimed to determine the impact of input costs on smallholder farmers of potato production in Kigamboni; to examine the impact of financial support on smallholder farmers of potato production in Kigamboni; to determine the impact of risks associated with potato production on smallholder farmers in Kigamboni, Moreover, this chapter presents background information on the respondents, such as gender, education, working experience, land ownership, and forms of loans received.

4.2 Demographic Information of the Respondents

This part indicates the demographic characteristics of the respondents. The researcher asked the respondents to respond to their personal information, such as gender, education, working experience, land ownership, and forms of loans received. The results are shown in Table 4.1.

The study examined the respondents' gender. The gender attribute aided in the understanding of the gender distribution in the target population. Results in Table 4.1 show that most of the respondents 63 (65.6%) were males and 33 (34.4%) were females. Results showed that males were more prevalent than females. These findings imply that the study was dominated by more males than females. These findings may also suggest that males were more likely than females to participate in

potato production in the research area.

Table 4.1: Demographic Information of the Respondents (n=96)

Demographic	Category	Frequency	Percentages (%)
Gender	Male	63	65.6
	Female	33	34.4
	Total	**96**	**100**
Education Level	Primary	27	28.1
	Secondary	63	65.6
	Tertiary	6	6.3
	Total	**96**	**100**
Farming Experience	< 3 years	18	18.8
	Between 3-5 years	32	33.3
	More than 5 years	46	47.9
	Total	**96**	**100**
Land Ownership	Rented/Hired	74	77.1
	Owned	22	22.9
	Total	**96**	**100**
Forms of loans	Cash	25	26
	Input form	-	-
	Both	12	12.5
	None	59	61.5
	Total	**96**	**100**

Source: Field Data, (2023).

Also, Table 4.1 shows the respondents' education level. Results revealed that many respondents fall into the secondary education level, with 63 (65.6%), followed by the primary education level with 27 (28.1%) respondents, and the tertiary education level with 6 (6.3%) respondents. Thus, respondents who attained a secondary education level extensively dominated the study. The level of education was an important attribute to ensure the study got accurate responses from the respondents.

Moreover, the results in Table 4.1 show the working experience. Findings indicate that 46 (47.9%) of the respondents claimed that they had farming experience of more than 5 years, 32 (33.3%) of the respondents stated that they had farming experience between 3-5 years, and 18 (18.8%) of the respondents claimed that they had farming experience of less than 3 years. Results revealed that the majority of the respondents

in the study had farming experience of more than 5 years. These findings imply that the majority of the respondents had at least some farming experience, which aided in getting accurate responses from them.

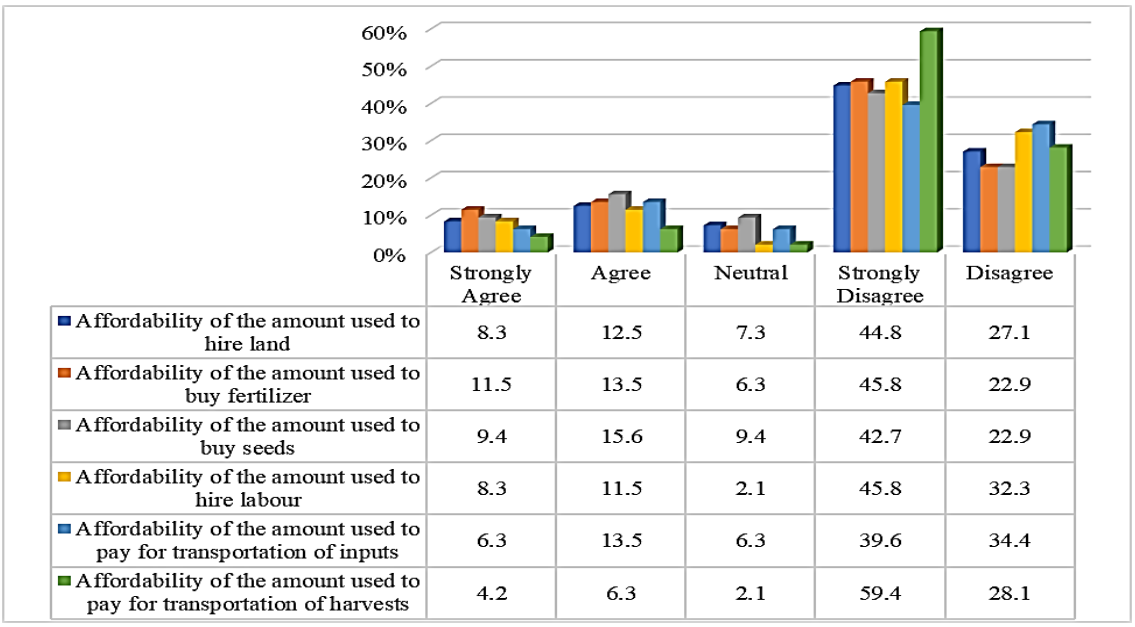
Furthermore, results in Table 4.1 show land ownership. Findings indicate that 74 (77.1%) of the respondents indicated that they rented or hired land for farming activities, while 22 (22.9%) of the respondents indicated that they owned the land for farming activities. Therefore, findings show that most of the respondents in the study rented or hired land for farming activities. Renting land for farming activities increases the cost of production for the farmer as it adds an additional expense in the form of rent. This can be particularly challenging if the rent is high and the farmer is not able to negotiate a lower rate. The increased cost of production can then be passed on to the consumer, who may be unwilling to pay more for the same product. Alternatively, the farmer may have to reduce their profit margin in order to maintain competitiveness in the market. In either case, renting land can be a significant financial burden for farmers, impacting both their own livelihood and the wider community.

Additionally, results in Table 4.1 show the forms of loans given to smallholder farmers of potatoes in Kigamboni. Results indicate that 59 (61.5%) of respondents receive no loans in their production activities, 25 (26%) of respondents receive loans in the form of cash, and 12 (2.5%) of respondents receive loans in the form of both inputs and cash in their production activities. Findings reveal that most smallholder farmers of potatoes in Kigamboni receive no loans for their production activities. Most smallholder farmers use their own capital in production activities as they have

limited access to credit facilities. This means they have to use their own savings and assets to purchase inputs such as seeds, fertilizers, and pesticides. This can create financial constraints, limiting their ability to scale up production or invest in new technologies.

4.3 The Impact of Input Costs on Smallholder Farmers of Potato Production in Kigamboni (n=96)

The study aimed to determine the impact of input costs on smallholder farmers of potato production in Kigamboni. Therefore, respondents were asked to indicate whether the amount used to hire land is affordable; the amount used to buy fertilizer is affordable; the amount used to buy seeds is affordable; the amount used to hire labour is affordable; the amount used to pay for transportation of inputs is affordable; and whether, the amount used to pay for transportation of harvests is affordable. Results are indicated in Figure 4.1.



	Strongly Agree	Agree	Neutral	Strongly Disagree	Disagree
Affordability of the amount used to hire land	8.3	12.5	7.3	44.8	27.1
Affordability of the amount used to buy fertilizer	11.5	13.5	6.3	45.8	22.9
Affordability of the amount used to buy seeds	9.4	15.6	9.4	42.7	22.9
Affordability of the amount used to hire labour	8.3	11.5	2.1	45.8	32.3
Affordability of the amount used to pay for transportation of inputs	6.3	13.5	6.3	39.6	34.4
Affordability of the amount used to pay for transportation of harvests	4.2	6.3	2.1	59.4	28.1

Figure 4.1: The Impact of Input Costs on Smallholder Farmers of Potato Production

Source: Field Data, (2023)

4.3.1 Affordability of the Amount Used to Hire Land

The study aimed to determine whether the amount used to hire land for farming activities is affordable. Findings in Figure 4.1 show that 43 (44.8%) of respondents disagreed, 26 (27.1%) of the respondents strongly disagreed, 12 (12.5%) of respondents agreed, 8 (8.3%) of the respondents strongly agreed, and 7 (7.3%) of the respondents neither agreed nor disagreed that the amount used to hire land for farming activities is affordable. Therefore, findings reveal that most respondents indicated that the amount used to hire land for farming activities is not affordable.

These findings show that the cost of hiring land for smallholder farmers in Kigamboni is high. There are several reasons why land leasing costs may be too high for smallholder farmers. One of the reasons is that the demand for land often outstrips the supply. In Kigamboni, there is a high demand for land for residential purposes, commercial development, and other non-farming activities. As a result, landlords can raise rents, knowing that they will still be able to find tenants willing to pay these high prices. Smallholder farmers who cannot afford to pay these prices are then left with no access to land, and those who can afford to pay increase their cost of production.

4.3.2 Affordability of the Amount Used to Buy Fertilizer

The study aimed to determine whether the amount used to buy fertilizer is affordable for farming activities. Findings in Figure 4.1 show that 44 (45.8%) of respondents disagreed, 22 (22.9%) of the respondents strongly disagreed, 13 (13.5%) of respondents agreed, 11 (11.5%) of the respondents strongly agreed, and 6 (6.3%) of the respondents neither agreed nor disagreed that the amount used to buy fertilizer is

affordable for farming activities.

Therefore, findings reveal that most respondents indicated that the amount used to buy fertilizer is not affordable for farming activities. These findings reveal that the price of fertilizer for most smallholder farmers is high. The high price of fertilizer increases the cost of production and reduces profitability. One of the main reasons for the high cost of fertilizer is the increasing demand for it worldwide. As global populations continue to grow, the demand for food is also rising, putting pressure on farmers to increase their yields. This, in turn, requires more fertilizer to be used to keep up with the demand.

4.3.3 Affordability of the Amount Used to Buy Seeds

The study aimed to determine whether the amount used to buy seeds is affordable for farming activities. Findings in Figure 4.1 show that 41 (42.7%) of respondents disagreed, 22 (22.9%) of the respondents strongly disagreed, 15 (15.6%) of respondents agreed, 9 (9.4%) of the respondents strongly agreed, and 9 (9.4%) of the respondents neither agreed nor disagreed that the amount used to buy seeds is affordable for farming activities. Therefore, findings reveal that most respondents indicated that the amount used to buy seeds is not affordable for farming activities. These findings reveal that the price of fertilizer for most smallholder farmers is high. This makes it difficult for them to invest in high-quality seeds and other inputs that are necessary for achieving better yields and improving their income. Without access to affordable seeds, farmers are forced to rely on traditional farming techniques that may not yield high enough to sustain their livelihoods.

4.3.4 Affordability of the Amount Used to Hire labour

The study aimed to determine whether the amount used to hire labour is affordable for farming activities. Findings in Figure 4.1 show that 44 (45.8%) of respondents disagreed, 31 (32.3%) of the respondents strongly disagreed, 11 (11.5%) of respondents agreed, 8 (8.3%) of the respondents strongly agreed, and 2 (2.1%) of the respondents neither agreed nor disagreed that the amount used to hire labour is affordable for farming activities. Therefore, findings reveal that most respondents indicated that the amount used to hire labour is not affordable for farming activities.

The amount spent by smallholder farmers to hire labour can significantly increase their production costs. Hiring labour is a crucial aspect of agricultural production, and it is usually a major contributor to the cost of production. Smallholder farmers typically have limited resources and often rely on their own labour or that of family members to work on their farms. However, as their farms grow or when they need to increase their production, they may need to hire additional labour, which can be costly. This means that farmers end up relying on family labour and cannot afford to hire additional workers to help them with farm work.

4.3.5 Affordability of the Amount Used to Pay for Transportation of Inputs

The study aimed to determine whether the amount used to pay for the transportation of inputs is affordable. Findings in Figure 4.1 show that 38 (39.6%) of respondents disagreed, 33 (34.4%) of the respondents strongly disagreed, 13 (13.5%) of respondents agreed, 6 (6.3%) of the respondents strongly agreed, and 6 (6.3%) of the respondents neither agreed nor disagreed that the amount used to pay for transportation of inputs is affordable.

Therefore, findings reveal that most respondents indicated that the amount used to pay for the transportation of inputs is not affordable. Transportation costs for inputs such as fertilizers, pesticides, and seeds are significant expenses for smallholder farmers. These inputs are essential for increasing crop yields and improving the quality of the crops, but the high cost of transportation often discourages farmers from using these inputs. This can lead to lower yields, delayed planting times, and reduced crop quality.

The cost of transportation can vary significantly depending on factors such as distance, terrain, the type of transport used, and availability of fuel. Furthermore, high transportation costs can also impact the availability and affordability of agricultural inputs for smallholder farmers.

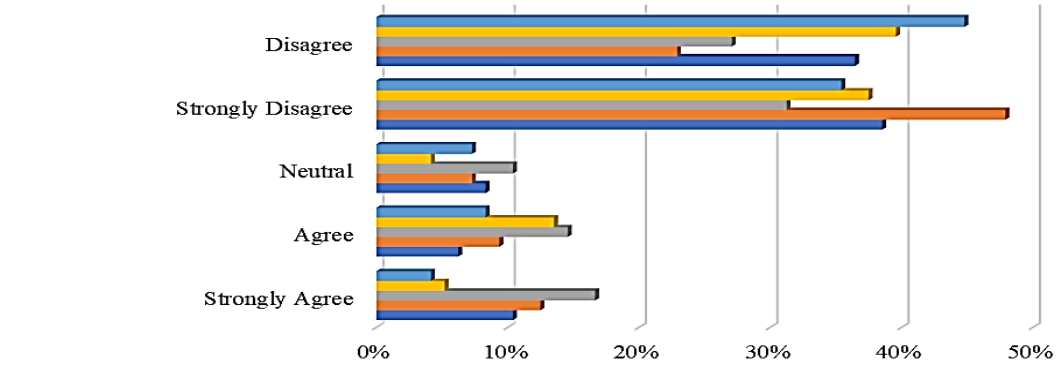
4.3.6 Affordability of the Amount Used to Pay for Transportation of Harvests

The study aimed to determine whether the amount used to pay for the transportation of harvests is affordable. Findings in Figure 4.1 show that 57 (59.4%) of respondents disagreed, 27 (28.1%) of the respondents strongly disagreed, 6 (6.3%) of respondents agreed, 4 (4.2%) of the respondents strongly agreed, and 2 (2.1%) of the respondents neither agreed nor disagreed that the amount used to pay for transportation of harvests is affordable. Therefore, findings reveal that most respondents indicated that the amount used to pay for the transportation of harvests is not affordable. For smallholders, transportation is a significant challenge, as most of them are prone to relying on middlemen or brokers to transport their crops to the market. Middlemen take advantage of smallholder farmers by charging exorbitant prices for transportation, thus reducing their profits. In most cases, farmers will have to travel

long distances to reach roads that are in good condition, which adds to transportation costs. The cost of transportation significantly impacts smallholders' profitability. High transportation costs decrease the profits earned by farmers, making their products less competitive in the market.

4.4 The Impact of Financial Support on Smallholder Farmers of Potato Production in Kigamboni (n=96)

The study aimed to examine the impact of financial support on smallholder farmers of potato production in Kigamboni. Therefore, respondents were asked to indicate whether the loan collateral is affordable; total days spent processing credit are short; the loan repayment period is affordable; there are other undocumented costs associated with securing credit; and the interest rate from the lender is affordable. Results are indicated in Figure 4.2.



	Strongly Agree	Agree	Neutral	Strongly Disagree	Disagree
Affordability of interest rate from the lender	4.2	8.3	7.3	35.4	44.8
Other undocumented costs associated with securing credit	5.2	13.5	4.2	37.5	39.6
Affordability of the loan repayment period	16.7	14.6	10.4	31.3	27.1
Total days spent processing credit are short	12.5	9.4	7.3	47.9	22.9
Affordability of loan collateral	10.4	6.3	8.3	38.5	36.5

Figure 4.2: The Impact of Financial Support on Smallholder Farmers of Potatoes Production
Source: Field Data, (2023)

4.4.1 The Affordability of Loan Collateral

The study aimed to determine whether the loan collateral is affordable for smallholder farmers of potato production. Findings in Figure 4.1 show that 37 (38.5%) of respondents disagreed, 35 (36.5%) of the respondents strongly disagreed, 10 (10.4%) of the respondents strongly agreed, 8 (8.3%) of the respondents neither agreed nor disagreed, and 6 (6.3%) of the respondents agreed that the loan collateral is affordable. Therefore, findings reveal that most respondents indicated that the loan collateral was not affordable. Potato production is a capital-intensive venture that requires significant investments in land, seed, fertilizers, pesticides, and labor.

Smallholder farmers often lack these resources and may rely on loans to finance their activities. The most commonly used collateral for loans is land or any other valuable possession that farmers can offer to the lending institution as a guarantee of loan repayment. However, for smallholder farmers, offering land as collateral may pose significant risks, including losing their land in the event of default or being unable to repay the loan. Moreover, the potato crop is highly susceptible to various diseases, pests, and environmental stresses, making it risky and unpredictable. The risks associated with potato production can increase the cost of credit for smallholder farmers, making it difficult for them to afford loan collateral.

4.4.2 The Total Days Spent Processing Credit Are Short

The study aimed to determine whether the total days spent processing credit are short. Findings in Figure 4.1 show that 46 (47.9%) of respondents disagreed, 22 (22.9%) of the respondents strongly disagreed, 12 (12.5%) of the respondents strongly agreed, 9 (9.4%) of the respondents agreed, and 7 (7.3%) of the respondents

neither agreed nor disagreed that total days spent processing credit are short. Therefore, findings reveal that most respondents indicated that total days spent processing credit are not short. These findings mean that the credit processing time for farming activities takes a long time, which is seen as a problem. This can cause difficulties for farmers who need credit to fund their activities, as they may have to wait a significant amount of time to receive the money they need. Longer processing times can also impact the efficiency and productivity of farming operations, as capital may be tied up in credit processing rather than being used for essential farming activities.

4.4.3 The Loan Repayment Period Is Affordable

The study aimed to determine whether the loan repayment period is affordable. Findings in Figure 4.1 show that 30 (31.3%) of respondents disagreed, 26 (27.1%) of the respondents strongly disagreed, 16 (16.7%) of the respondents strongly agreed, 14 (14.6%) of the respondents agreed, and 10 (10.4%) of the respondents neither agreed nor disagreed that the loan repayment period is affordable. Therefore, findings reveal that most respondents indicated that the loan repayment period was not affordable.

The loan repayment period for smallholder farmers who produce potatoes can be quite long, often spanning several years. This makes it difficult for farmers to keep up with their loan payments, especially if they experience unexpected crop losses or market downturns. As a result, many farmers end up defaulting on their loans, which can have serious consequences for their financial stability. One reason for the long repayment period is that potato production requires a significant upfront investment

in things like land preparation, seed, fertilizer, irrigation, and labor. These costs can be particularly challenging for small farmers who are already struggling to make ends meet. Moreover, the potato market is often volatile, with prices fluctuating unpredictably. This volatility can make it difficult for farmers to plan their repayments and budget for other expenses.

4.4.4 Other Undocumented Costs Associated with Securing Credit

The study aimed to determine whether there are other undocumented costs associated with securing credit. Findings in Figure 4.1 show that 38 (39.6%) of respondents disagreed, 36 (37.5%) of the respondents strongly disagreed, 13 (13.5%) of the respondents agreed, 5 (5.2%) of the respondents strongly agreed, and 4 (4.2%) of the respondents neither agreed nor disagreed that there are other undocumented costs associated with securing credit. Therefore, findings reveal that most respondents indicated that there are no other undocumented costs associated with securing credit. Some lenders may charge hidden fees, such as application fees, processing fees, or late payment fees. These fees can add up quickly and increase the total cost of the loan.

4.3.5 The Affordability of Interest Rate from the Lender

The study aimed to determine whether the interest rate from the lender is affordable. Findings in Figure 4.1 show that 43 (44.8%) of respondents strongly disagreed, 34 (35.4%) of the respondents disagreed, 8 (8.4%) of respondents agreed, 7 (7.3%) of the respondents neither agreed nor disagreed, and 4 (4.2%) of the respondents strongly agreed that the interest rate from the lender is affordable. Therefore, findings reveal that most respondents indicated that the interest rate from the lender

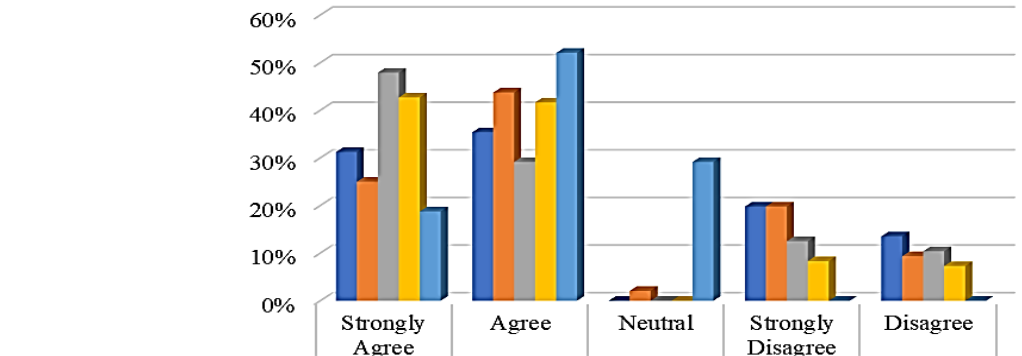
is not affordable. Access to affordable credit is a major challenge for smallholder farmers in many parts of the world, and this is particularly true in the potato production industry. One major factor that contributes to this problem is that lenders often charge high interest rates that are not affordable for small-scale producers.

There are several reasons why lenders might charge high interest rates to farmers. In some cases, it may be because the risk of lending to small-scale producers is perceived to be high. These farmers often lack collateral, credit histories, and other forms of financial security that can help reduce the lender's risk. In other cases, lenders may charge high interest rates simply because they can, particularly in places where there is limited competition among lenders.

Regardless of the reasons, the result is that smallholder farmers are often unable to access the credit they need to invest in their businesses and improve their livelihoods. This can be particularly challenging in the potato production industry, where farmers may need to purchase seeds, fertilizers, and other inputs before they can start planting crops.

4.5 The Impact of Risks Associated with Potato Production on Smallholder Farmers in Kigamboni (n=96)

The study aimed to determine the impact of risks associated with potato production on smallholder farmers in Kigamboni. Therefore, respondents were asked to indicate whether rainfall variations, diseases, accidental fire, an unstable price in the market, and long harvesting times affect their potato production. Results are indicated in Figure 4.3.



	Strongly Agree	Agree	Neutral	Strongly Disagree	Disagree
Rainfall variations	31.3	35.4	0	19.8	13.5
Diseases	25.0	43.8	2.1	19.8	9.4
Accidental fire	47.9	29.2	0	12.5	10.4
Unstable price in the market	42.7	41.7	0	8.3	7.3
Long harvesting times	18.8	52.1	29.2	0.0	0.0

Figure 4.3: The Impact of Risks Associated with Potato Production on Smallholder Farmers
Source: Field Data, (2023).

4.5.1 Rainfall Variations

The study aimed to determine whether rainfall variations affect farmers' potato production. Findings in Figure 4.3 show that 34 (35.4%) of the respondents agreed, 30 (31.3%) of respondents strongly agreed, 19 (19.8%) of respondents strongly disagreed, and 13 (13.5%) of the respondents disagreed that rainfall variations affect their potato production. Therefore, findings reveal that most respondents indicated that rainfall variations affect their potato production. A drought can significantly reduce potato yields as it limits the water supply that the plant needs. When there is insufficient water, potato plants do not develop properly, resulting in small tubers or no tubers being produced. Thus, drought can cause a major drop in potato production.

Also, excessive rainfall can cause flooding which can have severe negative impacts on potato production. When potatoes are flooded, it becomes harder for air and water

to circulate. This can lead to the formation of harmful bacteria and diseases, which can infect and damage the plants resulting in a reduction of yield. Also, rainfall variations can also have an impact on the quality of potatoes produced. For instance, excess rainfall can increase the number of blemishes (scab) on the potatoes, which makes them unsuitable for sale or consumption. Moreover, excess rainfall can also cause an increase in pest and disease infestations. Moisture creates an ideal environment for the growth of fungal spores that can cause potato blight, one of the most devastating diseases affecting potato production.

4.5.2 Diseases

The study aimed to determine whether diseases affect farmers' potato production. Findings in Figure 4.3 show that 42 (43.8%) of the respondents agreed, 24 (25%) of respondents strongly agreed, 19 (19.8%) of respondents disagreed, 9 (9.4%) of the respondents strongly disagreed, and 2 (2.1%) of the respondents neither agreed nor disagreed that diseases affect their potato production. Therefore, findings reveal that most respondents indicated that diseases affect their potato production. The production of potatoes is often hampered by diseases, which can lead to significant yield losses. Some of the most common diseases affecting potato production include late blight, early blight, potato virus Y, and bacterial wilt.

The impact of these diseases on potato production can be devastating, particularly for smallholder farmers who often lack the resources to effectively manage them. Late blight, for example, can cause up to 50–100% yield losses if not controlled early and effectively. This leads to significant income losses for farmers who rely on their potato crop for their livelihoods.

In addition to yield losses, diseases can also have a range of indirect impacts on smallholder farmers. For example, farmers may incur additional costs to purchase pesticides and treatments to manage these diseases, which can be costly and not always effective. Diseases can also lead to lower-quality potato crops, which can reduce prices and demand in local markets.

4.5.3 Accidental Fire

The study aimed to determine whether accidental fire affects farmers' potato production. Findings in Figure 4.3 show that 46 (49.9%) of the respondents strongly agreed, 28 (29.2%) of respondents agreed, 12 (12.5%) of respondents neither agreed nor disagreed, and 10 (10.4%) of the respondents disagreed that accidental fire affects their potato production. Therefore, findings reveal that most respondents indicated that accidental fire affects their potato production. These findings show that accidental fires have a significant impact on the potato production of smallholder farmers. The destruction of potato fields by accidental fire results in a loss of income and food, which can have devastating consequences for the well-being of smallholder farming families.

The impact of an accidental fire on potato production varies depending on the severity of the fire. A minor fire may only damage a few plants or a small area of the field and can be salvaged by the farmer. However, a major fire results in the complete destruction of the potato field, leaving the farmer with no means of income or food security for their family. Smallholder farmers who are affected by accidental fires may struggle to recover from the damage caused. They may have limited resources and not have access to insurance or other forms of financial assistance to

help them recover their losses. Farmers who do not have access to financial assistance may be forced to reduce their production levels or even abandon potato farming altogether.

4.5.4 Unstable Price in the Market

The study aimed to determine whether unstable prices in the market affect farmers' potato production. Findings in Figure 4.3 show that 41 (42.7%) of the respondents strongly agreed, 40 (41.7%) of respondents agreed, 8 (8.3%) of respondents neither agreed nor disagreed, and 7 (7.3%) of the respondents disagreed that the unstable price in the market affects their potato production. Therefore, findings reveal that most respondents indicated that unstable prices in the market affect their potato production. These findings show that unstable prices have been a significant challenge for smallholder potato farmers, as they can negatively affect crop yields, increase operating costs, and lower income levels. One significant effect of unstable prices is a decrease in overall yields. Smallholder farmers are more vulnerable to the financial impact of unstable prices since it makes it difficult for them to plan their production cycles. This challenge can result in lower volumes and lower-quality yields. The production of potatoes usually requires significant investments in inputs, including quality seeds, and fertilizers. Therefore, unstable prices can discourage production if these smallholder farmers cannot afford to absorb price fluctuations.

Moreover, unstable prices lead to an increase in operating costs for smallholder farmers. Input costs tend to fluctuate, leading to additional expenses and reducing the potential profit margins of farmers. The costs of vital inputs like seeds and fertilizers may increase, requiring more resources to produce the same amount of

potatoes, which would ultimately have a negative impact on farmers' profits.

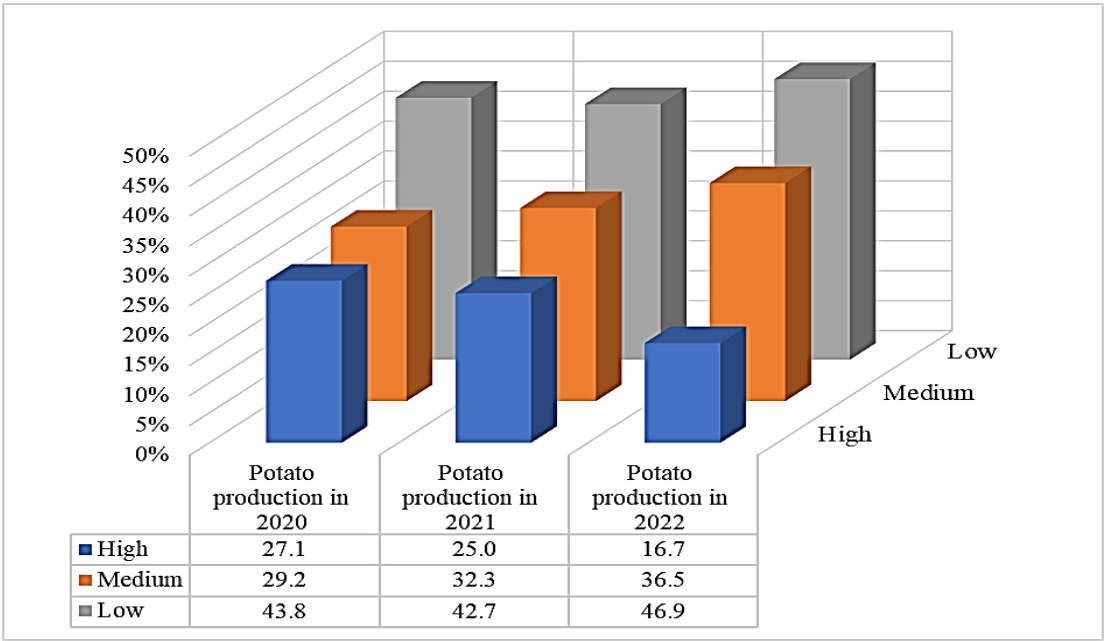
4.5.5 Long Harvesting Times

The study aimed to determine whether long harvesting times affect farmers ‘potato production. Findings in Figure 4.3 show that 50 (52.2%) of the respondents agreed, 28 (29.2%) of respondents neither agreed nor disagreed, and 18 (18.8%) of respondents strongly agreed that long harvesting times affects their potato production. Therefore, findings reveal that most respondents indicated that long harvesting times affect their potato production. These findings reveal that the long harvesting times involved in potato production are a significant challenge for smallholder farmers.

Most smallholder farmers lack access to modern farm machinery and equipment, which means that potato harvesting is predominantly done by hand. The use of hand tools like hoes and digging forks is time-consuming and labor-intensive, leading to long harvesting periods. The process requires a lot of physical effort, which can result in injuries, fatigue, and lower productivity. Also, the potato harvest time varies depending on the soil, climate, and altitude of the farming region. In certain areas, weather conditions like heavy rains and prolonged droughts can delay potato maturation, contributing to long harvesting periods. Moreover, smallholder farmers may not have access to reliable markets, making it challenging to sell their produce. Long harvesting seasons can be an added burden, causing further delays in selling their crops. This situation can discourage smallholder farmers from investing in potato crops.

4.6 The Status of Potato Production in Past Three Years

The study sought to identify the status of production of potatoes for the past three years. Findings are indicated in Figure 4.4.



	Potato production in 2020	Potato production in 2021	Potato production in 2022
High	27.1	25.0	16.7
Medium	29.2	32.3	36.5
Low	43.8	42.7	46.9

Figure 4.4: The Status of Potato Production in Past Three Years

Source: Field Data, (2023).

Findings in Figure 4.4 show that 42 (43.8%) of the respondents indicated that potato production in 2020 was low, while 28 (29.2%) of the respondents indicated that the production was medium, and 26 (27.1%) of the respondents indicated that the production was high. Therefore, the respondents show that the majority of the respondents indicated that the production of potatoes in 2020 was low. Also, findings in Figure 4.4 show that 41 (42.7%) of the respondents indicated that potato production in 2021 was low, while 31 (32.3%) of the respondents indicated that the production was medium, and 24 (25%) of the respondents indicated that the production was high. Therefore, the respondents show that the majority of the respondents indicated that the production of potatoes in 2021 was low.

Moreover, findings in Figure 4.4 show that 45 (46.9%) of the respondents indicated that potato production in 2021 was low, while 35 (36.5%) of the respondents indicated that the production was medium, and 16 (16.7%) of the respondents indicated that the production was high. Therefore, the respondents show that the majority of the respondents indicated that the production of potatoes in 2021 was low.

4.7 Inferential Analysis

The study performed multiple regression analysis to assess the impact of transaction costs on smallholder farmers of potatoes production in Tanzania. Before doing the multiple regression analysis, the researchers ran basic diagnostic tests such as normality, multi-collinearity, and autocorrelation to ensure that the data was fit. Furthermore, a Pearson correlation was used to identify the extent of the relationship between variables.

4.7.1 Diagnostic Test

4.7.1.1 Normality Test

Regression is a parametric test that assumes data are normally distributed. As a result, a normality test was employed in this study to determine if the data distribution was normally distributed or not. Figure 4.5 shows that dots are located closer to the diagonal line. The closer the dots are to the diagonal line, the more regularly distributed the residuals are. As a result, the dotted line trend indicates that the data are regularly distributed, and the normality assumption is accepted.

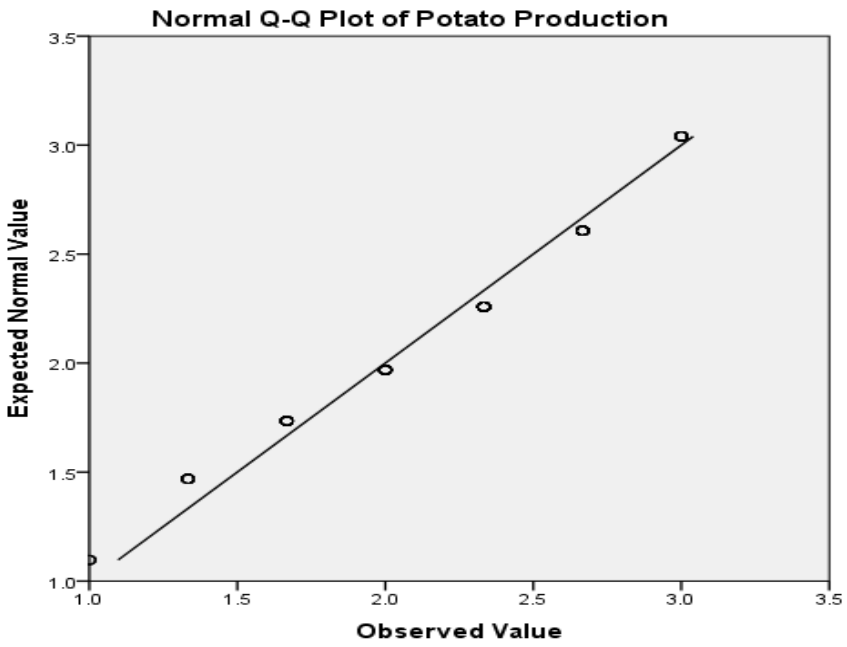


Figure 4.5: Normal Q - Q plot of regression Standardized Residual

Source: Field data, (2023).

4.7.1.2 Multi-Collinearity Test

The problem of high multicollinearity increases the variance of parameter estimation, and the estimation results are very sensitive to small changes in the model, that is, weak and difficult to explain. The high multicollinearity problem was diagnosed, and the results are shown in Table 4.3, which includes the Tolerance values (1/VIF) and Values of Inflation Factor (VIF). When 1/VIF is less than 0.10 and the VIF is greater than 10, there is a problem of multicollinearity. The results in Table 4.2 depicts that there is no significant high correlation between the explanatory variables, that is, there is no multicollinearity problem, because VIF is less than 10 and 1/VIF is higher than 0.10.

Table 4.2: Collinearity Diagnosis

Model	Collinearity Statistics	
	Tolerance	**VIF**
Input Costs	.971	1.030
Financial Support	.976	1.1025
Risk Associated	.992	1.008

Dependent variable: Potato Production

Source: Field data, (2023)

4.7.1.3 Homoscedasticity Test

The residuals should have a constant variance to meet the regression assumptions and be able to trust the results. Since, the point in Figure 4.6 are scattered then, data have homoscedasticity condition.

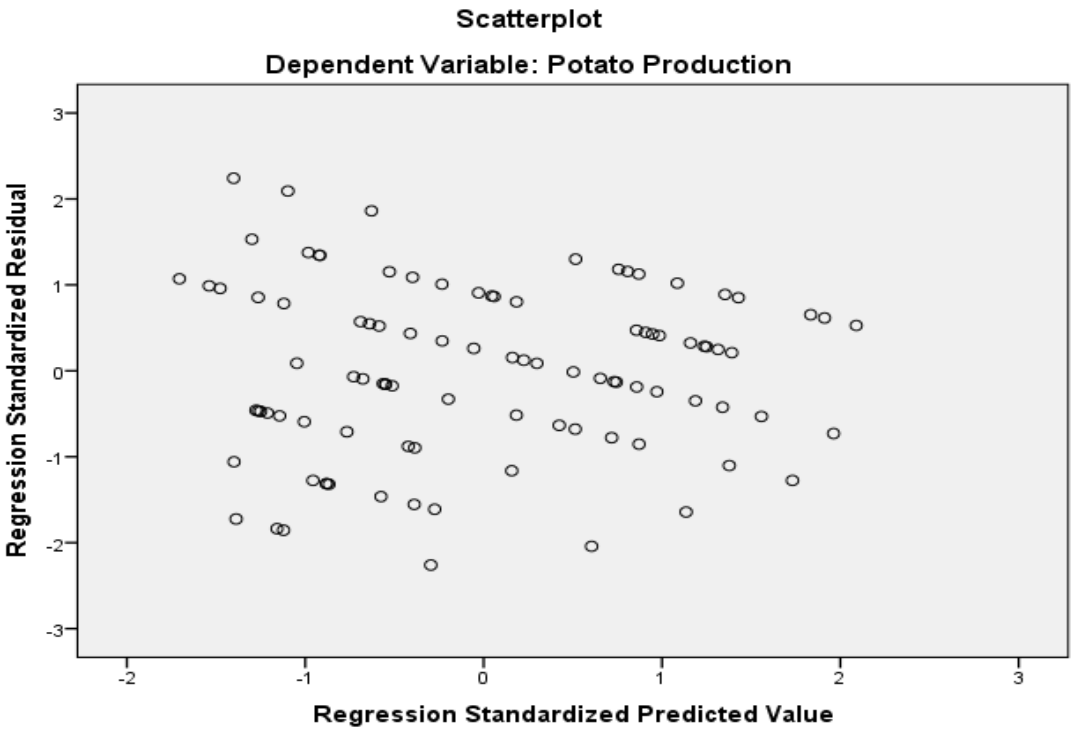


Figure 4.6: Homoscedasticity Test
Source: Field data, 2023

4.7.2 Correlation Analysis

The correlation test was applied to determine the extent of the relationship and statistically significant between the independent and dependent variables. Table 4.3 shows that input costs is statistically significant at p-value = 0.032 with R = 0.705; financial support is statistically significant at p-value = 0.009 with R = 0.729; risk associated is statistically significant at p-value = 0.000 with R = 0.437; as shown in Table 4.3.

Results reveal that input costs (R= 0.705) and financial support (R= 0.729) have a strong correlation with a potato production, while, risk associated (R= 0.437) has a weak correlation with a potato production.

Table 4.3: Correlation Matrix

		Input Cost	Financial Support	Risk Associated	Potato Production
Input Cost	Pearson Correlation	1			
	Sig. (2-tailed)				
	N	96			
Financial Support	Pearson Correlation	.153	1		
	Sig. (2-tailed)	.138			
	N	96	96		
Risk Associated	Pearson Correlation	.082	.041	1	
	Sig. (2-tailed)	.425	.691		
	N	96	96	96	
Potato Production	Pearson Correlation	.705	.729	.437**	1
	Sig. (2-tailed)	.032	.009	.000	
	N	96	96	96	96

**. Correlation is significant at the 0.01 level (2-tailed).

Source: Field data, (2023).

4.7.3 Model Summary of the Variables

Findings in Table 4.4 indicate the overall Pearson correlation coefficient (R) of 0.751 for all independent variables. This level of R indicates that the independent variables and the dependent variable have a strong relationship. Moreover, the results in Table 4.4 depict that the R-square (determination coefficient) where input costs, financial supports, and risk associated explain about 52.3% (0.523) of the proportional change (variation) in the potato production. The rest of the variation of 0.477 (47.7%) is explained by other factors not studied in this research. This value of the R-squared percentage indicates that the model is effective in explaining fluctuations in the dependent variable caused by fluctuations in the independent variables.

In addition, the Durbin-Watson test was used to see if there was any autocorrelation in Table 4.4. The observations (residuals) should be independent, which is one of the regression assumptions. When observations are made over a period of time, they are very likely connected. Durbin-Watson statistics should be between 1.5 and 2.5 in the absence of autocorrelation (related to subsequent observations). Because the statistic value of the Durbin-Watson test (i.e. 1.792) from Table 4.4 is within the specified range, it indicates that there is no autocorrelation and so the data is fit.

Table 4.4: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.751[a]	.523	.501	.51579	1.792

a. Predictors: (Constant), Input cost, Financial Support, and Risk Associated

b. Potato Production

Source: Field data, (2023).

4.7.4 Multiple Regression Results

Multiple regression analysis was used to assess the impact of transaction costs on smallholder farmers of potatoes production in Tanzania. Findings are indicated in Table 4.5.

Independent Variables	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	1.361	.423		3.219	.002
Input Cost	**-.018**	**.083**	**-.021**	**-.221**	**.026**
Land Hiring	-.037	.069	-.082	-.532	.046
Fertilizer	-.032	.037	-.075	-.876	.034
Seeds	-.054	.040	-.122	-1.329	.028
Labour	-.060	.038	-.133	-1.573	.020
Pesticides	-.058	.069	-.127	-.837	.005
Transportation	-.071	.053	-.123	-1.350	.181
Financial Support	**.078**	**.082**	**.090**	**.954**	**.042**
Credit availability	.032	.040	.074	.805	.023
Time wasted	-.016	.038	-.038	-.432	.667
Paper work	.119	.061	.259	1.952	.054
Interest rate	-.168	.067	-.336	-2.518	.014
Risk Associated	**-.011**	**.021**	**-.035**	**-4.647**	**.000**
Rainfall variations	-.068	.035	-.022	-.238	.012
Diseases	-.053	.038	-.125	-1.393	.048
Accidental fire	.101	.059	.183	1.702	.093
Unstable price in the market	.279	.089	.441	3.118	.003
Long harvesting time	.152	.100	.189	1.520	.133

a. Dependent Variable: Potato Production

Table 4.5: Coefficients

Source: Field data, 2023

4.7.4.1 The Impact of Input Costs on Smallholder Farmers of Potato Production in Kigamboni

Hypothesis Testing for Objective One

Null Hypothesis: Input costs has no significant impact on smallholder farmers of potatoes production in Kigamboni.

Alternative Hypothesis: Input costs has a significant impact on smallholder farmers of potatoes production in Kigamboni.

Results in Table 4.5 point out that land hiring cost is statistically significant at (t=-0.532, p (0.046) <0.05, n=96). Also, results reveal that every change of one unit in land hiring cost resulting in a change in potato production by 0.037. Thus, an increase in land hiring cost by one unit leads to a decrease in potato production by 0.037units. Higher land hiring costs increase the overall cost of potato production. Since potatoes are grown as a commodity crop, farmers rely on maintaining profitability to sustain their operations. When land costs rise, farmers may find it difficult to generate enough revenue to cover expenses, resulting in reduced profitability.

Also, results show that fertilizer cost is statistically significant at (t=-0.876, p (0.034) <0.05, n=96). Also, results reveal that every change of one unit in fertilizer cost resulting in a change in potato production by 0.032. Thus, an increase in fertilizer cost by one unit leads to a decrease in potato production by 0.032 units. An increase in fertilizer cost can indeed have a negative impact on potato production. Fertilizers play a crucial role in providing essential nutrients to the soil, which are necessary for healthy plant growth and development. Potatoes, like many other crops, require a sufficient supply of nutrients to achieve optimal yields.

When fertilizer costs rise, farmers may face challenges in affording or accessing an adequate amount of fertilizers for their potato crops. As a result, they might be inclined to reduce their fertilizer usage or use lower-quality alternatives, which can

lead to nutrient deficiencies in the soil. Nutrient deficiencies can negatively affect potato plants' growth, reduce their resistance to diseases and pests, and ultimately result in lower potato yields.

Moreover, results show that seed cost is statistically significant at (t=-1.329, p (0.028) <0.05, n=96). Also, results reveal that every change of one unit in seed cost resulting in a change in potato production by 0.054. Thus, an increase in seed cost by one unit leads to a decrease in potato production by 0.054 units. Higher seed costs mean that farmers have to spend more money to purchase the same quantity of seeds. This can strain their budget and limit their ability to buy the required amount of quality seeds for planting.

Furthermore, results show that labour cost is statistically significant at (t=-1.573, p (0.020) <0.05, n=96). Also, results reveal that every change of one unit in labour cost resulting in a change in potato production by 0.060. Thus, an increase in labour cost by one unit leads to a decrease in potato production by 0.060 units. Labor is one of the important inputs in agricultural production, and when the cost of labor increases, it can affect the profitability and productivity of potato farms. With higher labor costs, farmers may opt to reduce the area under potato cultivation. This could result in a decrease in overall potato production.

Likewise, results show that pesticide cost is statistically significant at (t=-0.837, p (0.005) <0.05, n=96). Also, results reveal that every change of one unit in pesticide cost resulting in a change in potato production by 0.058. Thus, an increase in pesticide cost by one unit leads to a decrease in potato production by 0.058 units.

Increases in pesticide costs have a negative impact on potato production. Pesticides are commonly used in agriculture to control pests, diseases, and weeds that can damage crops like potatoes. When the cost of pesticides rises, farmers may choose to reduce their usage or opt for more affordable alternatives. Reduced pesticide use can lead to increased pest pressure, which can negatively affect potato plants. Pests can damage the foliage, tubers, or both, resulting in lower yields and poorer quality potatoes. In the absence of effective pest control, diseases can also spread more easily, further impacting potato production. Also, results show that transportation cost is not statistically significant at (t=-1.350, p (0.181) <0.05, n=96). Thus, these results reveal that transportation cost has no significant impact on potato production.

Overall results in Table 4.5 point out that input cost is statistically significant at (t=-0.221, p (0.26) <0.05, n=96). Also, results reveal that every change of one unit in input costs resulting in a change in potato production by 0.018. Thus, an increase in input cost by one unit leads to a decrease in potato production by 0.018 units. Therefore, when there is an increase in input costs, such as the cost of fertilizers, seeds, land, labor, or pesticides result in a decrease in a potato production.

4.7.4.2 The Impact of Financial Support on Smallholder Farmers of Potato Production in Kigamboni

Hypothesis Testing for Objective Two

Null Hypothesis: Financial support has no significant impact on smallholder farmers of potatoes production in Kigamboni.

Alternative Hypothesis: Financial support has a significant impact on smallholder farmers of potatoes production in Kigamboni.

Results in Table 4.5 point out that credit availability is statistically significant at (t= 0.805, p (0.023) <0.05, n=96). Also, results reveal that every change of one unit in credit availability resulting in a change in potato production by 0.032. Thus, an increase in credit availability by one unit leads to an increase in potato production by 0.032 units. Increased credit availability can enable farmers to invest in modern farming equipment, better seeds, fertilizer, and other inputs. This can enhance productivity, leading to increased potato production. Additionally, farmers may have better access to funds for irrigation systems, which can improve crop yields.

Also, results show that time wasted, and paper work in applying for loans from the financial institutions are not statistically significant at (t=-0.432, p (0.667) <0.05, n=96), and (t=1.952, p (0.054) <0.05, n=96) respectively. Thus, these results reveal that time wasted and paper work have no significant impact on potato production. Moreover, results show that interest rate from the financial institutions is statistically significant at (t=-2.518, p (0.014) <0.05, n=96). Also, results reveal that every change of one unit in interest rate resulting in a change in potato production by 0.168. Thus, an increase in interest rate by one unit leads to a decrease in potato production by 0.168 units. When interest rates increase, borrowing costs for farmers may rise, making it more expensive for them to access credit for purchasing inputs, such as seeds, fertilizers, and machinery. This could potentially lead to reduced investment in potato production and a decrease in overall output if farmers are unable or unwilling to secure the necessary financing.

Furthermore, overall results in Table 4.5 point out that financial support is statistically significant at (t= 0.954, p (0.042) <0.05, n=96). Also, results reveal that

every change of one unit in financial support resulting in a change in potato production by 0.078. Thus, an increase in financial support by one unit leads to an increase in potato production by 0.078 units. Financial support can be in the form of subsidies, loans, or grants from the government or private sector to farmers. With more financial resources, farmers can invest in better equipment, fertilizers, pesticides, and seeds, leading to an increase in potato production.

4.7.4.3 The Impact of Risk Associated on Smallholder Farmers of Potato Production in Kigamboni

Hypothesis Testing for Objective Three

Null Hypothesis: Risk associated has no significant impact on smallholder farmers of potatoes production in Kigamboni.

Alternative Hypothesis: Risk associated has a significant impact on smallholder farmers of potatoes production in Kigamboni.

Results in Table 4.5 point out that rainfall variations are statistically significant at ($t= -0.238$, $p (0.012) <0.05$, $n=96$). Also, results reveal that every change of one unit in rainfall variations resulting in a change in potato production by 0.068. Thus, an increase in rainfall variations by one unit leads to decrease in potato production by 0.068 units. Excessive rainfall can lead to waterlogging of the soil, which deprives the potato plants of oxygen and can cause root rot. It can also leach away essential nutrients from the soil, negatively impacting the plants' growth and yield.

Additionally, heavy rainfall can cause erosion, washing away the topsoil along with valuable nutrients and organic matter. On the other hand, prolonged periods of drought or insufficient rainfall can also harm potato production. Potatoes require

adequate moisture during their growing season, especially during tuber formation and bulking stages. Insufficient water availability can result in stunted growth, reduced tuber size, and lower yields.

Also, results show that diseases are statistically significant at (t=-1.393, p (0.048) <0.05, n=96). Also, results reveal that every change of one unit in diseases resulting in a change in potato production by 0.053. Thus, an increase in diseases by one unit leads to decrease in potato production by 0.053 units. An increase in diseases such as Fungal or Bacterial Infections result in significant crop losses if not properly managed. Infected plants may show symptoms such as leaf spots, wilting, rotting, or tuber damage, ultimately reducing the overall potato yield. Moreover, results show that point out that accidental fire and long harvesting time are not statistically significant at (t=1.702, p (0.093) <0.05, n=96) and (t=1.520, p (0.133) <0.05, n=96) respectively. Thus, these results reveal that accidental fire and long harvesting time have no significant impact on potato production.

Furthermore, results show that unstable price in the market are statistically significant at (t=3.118, p (0.003) <0.05, n=96). Also, results reveal that every change of one unit in unstable price in the market resulting in a change in potato production by 0.279. Thus, an increase in unstable price in the market by one unit leads to increase in potato production by 0.279 units. Unstable prices can make it difficult for potato farmers to predict their income and manage production costs effectively. If prices are consistently low, farmers may find it financially challenging to sustain their potato production. In such cases, they might reduce their planting area or switch to more profitable crops, resulting in a decrease in

potato production.

Additionally, overall results in Table 4.5 point out that risk associated is statistically significant at (t= -4.647, p (0.000) <0.05, n=96). Also, results reveal that every change of one unit in risk associated resulting in a change in potato production by 0.011. Thus, an increase in risk associated by one unit leads to an increase in potato production by 0.011 units. Therefore, an increase in risks such as rainfall variations, diseases, and unstable prices in the market decreases potato production.

4.7.5 Summary of the Findings

The study aimed to the impact of transaction costs on smallholder farmers of potatoes production in Tanzania per the following null hypotheses;

Table 4.6: Summary of the hypothesis tested

Null Hypothesis	Comparison	Decision
$H_{1:}$ Input costs has no significant impact on potato production	P-value (0.026) < 0.05	Alternative hypothesis is Accepted
$H_{2:}$ Financial support has no significant impact on potato production	P-value (0.042) < 0.05	Alternative hypothesis is Accepted
$H_{3:}$ Risk associated has no significant impact on potato production	P-value (0.000) < 0.05	Alternative hypothesis is Accepted

Source: Researcher data (2023)

CHAPTER FIVE

DISCUSSION OF FINDINGS

5.1 Introduction

This study assessed the impact of transaction costs on smallholder farmers' potato production in Tanzania. This section debates the findings of the study analysed in Chapter Four, and the discussion of the findings is based on specific objectives.

5.2 The Impact of Input Costs on Smallholder Farmers of Potato Production in Kigamboni

The first objective of the study was to determine the impact of input costs on smallholder farmers of potato production in Kigamboni. Findings from the multiple regression analysis show that input cost has a statistical negative significant impact on potato production. Also, findings reveal that the amount used to hire land for farming activities is not affordable. These findings show that the cost of hiring land for smallholder farmers in Kigamboni is high. Smallholder farmers often cannot afford to purchase their own land for farming. Instead, they rely on renting or leasing land from other landowners. However, the cost of renting or leasing land can be prohibitively high, making it difficult for smallholder farmers to make a living from agriculture. For example, as indicated by Jayne et al. (2019) in some countries in sub-Saharan Africa, the cost of renting land can be as much as 60% of a farmer's income.

This high cost of renting land can have a number of negative effects on smallholder farmers. Firstly, it can force smallholder farmers to take out loans or sell off their assets in order to pay for their farming activities. This can lead to a cycle of debt that

is difficult to break out of, perpetuating poverty and inequality. Also, if smallholder farmers are unable to afford the cost of renting land, they may be forced to abandon farming altogether or lease their land to larger farmers or agribusinesses, further reducing their control over their own resources.

Moreover, the high cost of renting land can discourage smallholder farmers from adopting more sustainable and efficient farming practices, such as crop rotation or agroforestry. These farming practices require long-term investment in land management and may yield benefits only after several growing seasons. Hence, smallholder farmers may not be willing to invest in sustainable practices if they are unsure if they will be able to afford the land in the future.

The findings of the study are in line with those of Vicol (2017) who indicated that most smallholders in Ethiopia are challenged by the limited land for potato production, which results in an increase in the production cost as the cost of hiring land is high due to high land demand. Many small-scale farmers struggle to access land, and those who do often find that the cost of renting the land is too high to be sustainable. The high cost of land rental may prevent farmers from investing in other crucial aspects of their farming practices, such as improved seeds, fertilizers, and irrigation systems. Also, the high cost of land rental makes it difficult for small-scale farmers to compete with larger commercial farms that have the resources to pay for rental fees. This issue reinforces systemic inequalities that contribute to poverty and limited economic growth in rural areas, where the majority of smallholder potato farmers reside.

The amount used by smallholder farmers to hire land for potato production in Tanzania varies depending on the region and type of land. Generally, the cost of land rental for potato farming in Tanzania is relatively affordable compared to other countries in the region. According to a survey conducted by the Tanzanian government, the average cost of leasing land for potato production is around TZS 80,000 – 100,000 per acre per season. However, in some areas where land is more fertile and accessible, the cost can be higher (TZS 100,000 – 200,000) while in remote and less fertile areas, the cost can be lower (TZS 50,000).

Despite being relatively affordable, land rental costs can still pose challenges for smallholder potato farmers in Tanzania. Many small-scale farmers struggle to access land due to limited availability and competition from larger commercial farms. Additionally, the cost of land rental can make up a significant portion of smallholder farmers' production expenses, limiting their ability to invest in other essential farming inputs such as high-quality seeds, fertilizers, and pesticides.

Also, the study aimed to determine whether the amount used to buy fertilizer is affordable for farming activities. Findings reveal that the amount used to buy fertilizer is not affordable for farming activities. These findings reveal that the price of fertilizer for most smallholder farmers is high. The high price of fertilizer increases the cost of production and reduces profitability. The high cost of fertilizer is a major obstacle to the growth and development of agriculture in Tanzania. Smallholder farmers who lack the resources to buy fertilizer for potato production are unable to yield viable harvests, which negatively affects their incomes. High fertilizer prices advertised by agro-dealers and other suppliers, coupled with the lack

of governmental subsidies for inputs, compound the cost challenges faced by smallholder farmers.

The findings of the study are in line with those of Ogola et al. (2011), and Ismail et al. (2015), who indicated that the high fertilizer prices increase the cost of production. Transaction costs increase the price of fertilizers for smallholder farmers. When smallholder farmers want to buy fertilizers, they have to consider various costs such as transportation, storage, and other related fees. These costs can significantly increase the price of fertilizer, making it unaffordable for smallholder farmers. As a result, they may opt not to buy enough fertilizer, which can lead to low yields and reduced productivity.

The high transaction costs limit the accessibility of fertilizers for smallholder farmers. Some smallholder farmers live in remote areas, and to buy fertilizers, they have to travel long distances. During transportation, additional costs such as road tolls and port charges arise, making it hard for smallholder farmers to access quality fertilizers. This process can be time-consuming and expensive, and not all smallholder farmers can afford the extra costs. Also, sometimes transaction costs can result in delayed access to fertilizers. When smallholder farmers have to go through intermediaries to buy fertilizers, they may have to wait longer than expected. This delay can push back the planting season, leading to poor yields and reduced productivity. Smallholder farmers may even miss the ideal planting season, leading to a complete crop failure.

Moreover, the study aimed to determine whether the amount used to buy seeds is affordable for farming activities. Findings reveal that the amount used to buy seeds

is not affordable for farming activities. These findings reveal that the price of fertilizer for most smallholder farmers is high. This makes it difficult for them to invest in high-quality seeds and other inputs that are necessary for achieving better yields and improving their income.

The impact of high transaction costs affects the quantity and quality of seeds smallholder farmers can acquire for potato production. The costs incurred in accessing the market, searching for suppliers, and transportation make it difficult for smallholder farmers to access seed markets and buy high-quality seeds. This problem is further compounded by the challenges of accessing credit and financial services and the lack of farming inputs. Consequently, smallholder farmers are forced to purchase low-quality seeds at higher prices, which affects the development of their agricultural activities and overall livelihoods.

Similarly, the study aimed to determine whether the amount used to hire labour is affordable for farming activities. Findings reveal that the amount used to hire labour is not affordable for farming activities. The amount spent by smallholder farmers to hire labour can significantly increase their production costs. The high cost of labor affects the potato production of smallholder farmers, as they rely heavily on manual labor for tasks such as planting, weeding, and harvesting. The high labor costs reduce their profitability and make it difficult for them to compete with larger farms that can afford to invest in mechanized equipment and technology. Furthermore, the shortage of skilled labor in potato production areas also affects potato production, as farmers may struggle to find workers to help them with their crops. This can lead to delays in planting and harvesting, which can impact the quality and yield of the crop.

Furthermore, findings reveal that the amount used to pay for the transportation of inputs and harvest is not affordable. Transportation costs for inputs such as fertilizers, pesticides, and seeds are significant expenses for smallholder farmers. The findings of the study are in line with those of Adepoju (2014), who indicated that the transportation costs for inputs from the market to the farm and the transportation costs for harvests from the farm to the market are very high.

Potatoes require a range of inputs for successful cultivation, including seeds, fertilizers, and pesticides. These inputs are often sourced from companies located far from the smallholder farmers' fields. This means that farmers must pay transportation costs to have these inputs delivered to their farms. The cost of transportation is high for farmers who live in remote areas, where transportation infrastructure is poorly developed. These costs eat into farmers' profits, and in some cases, they may be forced to reduce the amount of input they use or switch to cheaper, lower-quality options.

Once the potatoes are harvested, smallholder farmers must transport their crops to markets or processing facilities. Again, transportation costs can be a significant burden for farmers. If they must travel long distances to reach markets, they may need to pay for trucks or other transportation equipment, which can be expensive. In some cases, road conditions may be poor, making it difficult to transport crops safely and efficiently. All of these factors add significant costs to potato production, which can affect farmers' incomes. These findings are supported by Bombo (2013), who showed that high transportation costs limit smallholder farmers' access to markets. If farmers cannot afford to transport their crops to markets, they may be forced to sell

to local intermediaries at lower prices. These middlemen may have greater bargaining power, and the farmers may receive a smaller share of the profits. This, in turn, can make it harder for smallholder farmers to invest in their farms, purchase better inputs, or improve their farm management practices.

The findings of the study are also supported by Hennart (2005)'s transaction cost theory, according to which any business or economic activity should aim to reduce transactional costs. The theory showed that in addition to the costs associated with the actual movement of goods (potatoes) from point A to point B, the exchange process itself is expensive due to the costs associated with gathering market data, negotiating contracts, monitoring, enforcing agreed-upon transactions, and marketing their produce.

5.3 The Impact of Financial Support on Smallholder Farmers of Potatoes Production in Kigamboni

The second objective of the study was to examine the impact of financial support on smallholder farmers of potatoes production in Kigamboni. Findings from the multiple regression analysis show that financial support has a statistical positive significant impact on potato production. Findings reveal that the loan collateral is not affordable. This is especially true in developing countries such as Tanzania, where smallholder farmers often have limited resources and are unable to meet the stringent collateral requirements for loans.

In the case of potato production in Tanzania, smallholder farmers find it difficult to provide affordable collateral for loans. The traditional method of financing involves

providing collateral in the form of assets or property, which can be seized by the lender if the borrower cannot meet the loan obligation. However, in Tanzania, smallholder farmers may not have sufficient assets or property to provide as collateral for a loan. This makes it challenging for them to access financing to invest in their potato production activities.

The collateral requirements set by financial institutions are often unaffordable for smallholder farmers, particularly those with limited resources or who operate on a small scale. This makes it difficult for these farmers to access financing, which is central to improving their productivity and incomes. As a result, many smallholder farmers are locked out of the formal financial system and are unable to access the credit they need to improve their livelihoods. According to Onumah and Meijerink (2012), innovative models for financing smallholder farmers are emerging with the hope of addressing the collateral requirement challenge. For instance, group guarantees, community banking, and crop insurance products have been created to expand the range of assets that can be used as collateral. These forms of financing are not reliant on traditional forms of collateral, such as land and property, but rather on the collective and community approach that smallholder farmers bring to group guarantees. It is hoped that these models will allow smallholder farmers to access loans at more affordable interest rates, thus enabling them to invest in their potato production activities.

The findings of this study are in line with Collier and Dercon (2014) who indicated that loan collateral is not affordable by smallholder farmers. Potato production in Tanzania is seasonal, and smallholder farmers may experience infrequent harvests

due to unfavourable weather conditions or pest infestation. This makes it challenging for them to repay the loan within the loan duration and meet the loan collateral requirements. Smallholder farmers may not have any assets that can be used as collateral for a loan. Most smallholder farmers in Tanzania do not own land or property, which makes it difficult to access credit. Thus, financial institutions in Tanzania may not trust smallholder farmers because they have a high risk of defaulting on loans. This means that farmers may struggle to secure a loan, even if they have collateral.

Also, the study aimed to determine whether the total days spent processing credit were short. Findings reveal that most respondents indicated that the total days spent processing credit are not short. It is true that the total days spent processing credit in financial institutions can often be long, and this can be a challenge for smallholder farmers who need quick access to loans. Financial institutions typically require a lot of paperwork and documentation to process loan applications, including collateral, credit history, and business plans. This can be particularly challenging for smallholder farmers, who may not have formal education or access to financial advisors to guide them through the loan application process.

The findings of this study are in line with those of Antwi and Ohene-Yankyira (2017) who indicated that the total days spent processing credit at financial institutions are too long for maize farmers. Insufficient documentation and a lack of collateral are some of the major reasons why loan applications from smallholder farmers take longer to process. It may take several days or even weeks for financial institutions to review and verify all the necessary documents and collateral before

approving a loan. This can be a significant barrier for smallholder farmers, who may need funding quickly to purchase seeds, fertilizers, and other inputs before the planting season.

Moreover, findings reveal that the loan repayment period is not affordable. Short loan repayment periods, which typically range from one to three years, create a significant financial strain on smallholder farmers. These farmers often rely on seasonal income, which means that they may not have regular cash flows throughout the year. With short repayment periods, farmers have to make regular loan payments, often monthly or quarterly, leaving little room for financial flexibility. They may have to make sacrifices to keep up with the loan payments, cutting back on essentials like food, healthcare, and education. Short repayment periods tend to have the opposite effect, as farmers who are unable to repay the loans within the specified period face additional costs such as late payment charges. The additional costs increase the transaction costs associated with borrowing and make the loan more expensive for the farmer.

Another associated problem is that farmers may be forced to take out multiple loans to meet their financial needs. This approach is likely to increase transaction costs further as farmers will have to process multiple applications and pay fees for each of them. This strategy increases the overall cost of borrowing for farmers and can result in an unnecessary burden.

The findings of the study are different from those of Odhong' et al. (2019) who indicated that the loan repayment period is too long for smallholder farmers. The

loan repayment period refers to the time frame in which borrowers must repay the principal and interest on a loan. Financial institutions typically offer repayment periods of several years, which can range from five to ten years. This is a long time for smallholder farmers, who have limited financial resources and often have to deal with unpredictable weather conditions, pest infestations, and other factors that affect their crop yields. The long repayment period also creates a burden for farmers, who have to make regular loan payments over an extended period. This put added pressure on farmers, who are already struggling to make ends meet. Many farmers may have to sacrifice their living standards to keep up with the loan payments, while others may default on their loans, leading to further financial difficulties.

The study aimed to determine whether the interest rate from the lender was affordable. Findings reveal that most of the interest rates from the lender are not affordable. High interest rates increase transaction costs for smallholder farmers, which can have a significant impact on their livelihoods and ability to remain economically viable. The smallholder farmers who produce potatoes often operate with limited resources and access to credit. Therefore, high interest rates can exacerbate their already precarious financial situation and potentially lead to insolvency.

One of the most direct impacts of high interest rates is that borrowing becomes more expensive and often unaffordable for smallholder farmers. When interest rates are high, credit becomes out of reach for many farmers, making it difficult to invest in their businesses. This can result in reduced productivity, lower-quality products, and decreased profitability. The less money smallholder farmers are able to access, the

less they can invest in their crops, expand their operations, and afford the necessary technology, equipment, and inputs required to compete in the market.

Also, according to Assogba et al. (2017), high-interest rates also discourage smallholder farmers from saving, which is an important aspect of building a successful business. This is because high interest rates make it more expensive to keep the money in a savings account, which makes it harder for smallholders to plan and achieve their long-term goals. Moreover, high interest rates increase the risk of default by smallholder farmers, which is typically managed by imposing stringent collateral requirements. Given their limited access to financial assets, many farmers are unable to put up significant collateral to secure a loan. As a result, they may be forced to seek more expensive and riskier sources of funding, such as loan sharks, which can result in adverse consequences such as excessive debt and bankruptcy.

5.4 The Impact of Risks Associated with Potato Production on Smallholder Farmers in Kigamboni

The study aimed to determine the impact of risks associated with potato production on smallholder farmers in Kigamboni. Findings from the multiple regression analysis show that risk associated has a statistical negative significant impact on potato production. Findings reveal that rainfall variations affect potato production. Rainfall variations significantly impact agricultural production, particularly for smallholder farmers, who often have limited resources and access to information and technology. According to Alberto (2013), in Tanzania, potato production is highly affected by seasonal rainfall variations, which can lead to either drought or floods, both of which can have detrimental effects on crop yields. These variations in rainfall mean farmers

must continuously monitor weather patterns, anticipate these problematic scenarios, and adjust their production techniques to mitigate their impact on crop production. Continuously monitoring weather patterns and making necessary adjustments to production techniques can be both time-consuming and expensive, thereby increasing the transaction costs of smallholder farmers.

Sometimes, farmers engage in additional crop insurance or protection against these natural disasters, which further increases the transaction costs of farming. These costs may include fees for insurance policies, the price of applying pesticides or other protective measures, and the purchase of necessary equipment to monitor and manage crop health continuously. Also, the study aimed to determine whether diseases affect farmers' potato production. Findings reveal that diseases affect their potato production. The potato is a crop of great importance to many smallholder farmers in Tanzania.

However, there are several diseases that can affect potato production, and these can significantly increase the transaction costs for smallholder farmers. According to Tsedaley (2014), late blight is a fungal disease that affects the leaves, stems, and tubers of potato plants. It is a devastating disease that can cause significant yield losses and reduce the quality of the harvest. To control late blight, farmers may need to use fungicides and other chemical treatments, which can be expensive and time-consuming. This can represent a significant increase in transaction costs for farmers.

Similarly, as indicated by Kheirandish and Harighi (2015), bacterial wilt is another disease that can affect the production of potatoes in Tanzania. It causes wilting,

yellowing, and necrosis of the leaves and stems of potato plants and is caused by a bacterium that can survive in soil for several years. Farmers need to use crop rotation, soil sterilization, and other management practices to reduce the risk of bacterial wilt. These practices require additional time, effort, and resources from farmers, increasing the transaction costs of potato production. Finally, Torrance and Talianksy (2020) potato virus Y is a viral disease that can cause stunted growth, leaf distortion, and reduced yields in potato plants. It is spread by aphids and other insects and can be challenging to control. Farmers may need to use insecticides to control aphids, which can increase their costs.

All of these diseases can increase transaction costs of potato production for smallholder farmers. Farmers may need to spend more money on inputs such as seeds, fertilizers, and pesticides, as well as invest more time in monitoring their crops and implementing disease control measures. If they experience significant yield losses or reduced quality due to disease, they may need to spend more time and money on marketing their crops or finding alternative sources of income. Also, the study aimed to determine whether accidental fire affects farmers' potato production.

Findings reveal that most respondents indicated that accidental fire affects their potato production. One way in which fire accidents increase transaction costs is by destroying potato farms and products. A single fire can destroy the entire potato crop, resulting in a loss of income for the farmer. The farmer needs to incur additional expenses to acquire new seeds, hire labor to clear the land and replant the crop.

This results in higher production costs, which can lead to a rise in prices, reducing the farmer's competitiveness in the market. Another way in which fire accidents increase transaction costs is through additional paperwork and administrative costs. Insurances, such as fire insurance, are not typically owned by smallholder farmers in Tanzania due to their high costs. As a result, when a fire occurs, they must rely on their savings or loans to manage the impacts. This requires more time and paperwork and can result in additional financial costs, reducing their profits.

The study aimed to determine whether unstable prices in the market affect farmers' potato production. Findings reveal that most respondents indicated that unstable prices in the market affect their potato production. The market for potatoes in Tanzania is highly unpredictable, with prices often fluctuating depending on various factors such as weather, demand, and supply. This unpredictability creates challenges for smallholder farmers who rely on potato production for their income. For instance, when prices are low, farmers are forced to sell their produce at a loss, while at the same time, they still have to incur costs such as purchasing inputs, paying labor costs, and transport costs. This implies that farmers bear the cost of price instability in the market, which translates to reduced returns on their investments.

The findings of the study are supported by Groot et al. (2020) who revealed that unstable prices in the market affect the timing of transactions, which also increases the transaction costs incurred by smallholder farmers. For instance, when prices are low, farmers may decide to delay the sale of their potatoes to avoid losses, but this

also means that they have to incur additional costs such as storage costs and the risk of storage losses. On the other hand, when prices are high, farmers may be compelled to sell their produce early, resulting in lower returns as they miss out on potential price increases. Also, unstable prices create an information asymmetry between smallholder farmers and buyers, leading to increased transaction costs. Buyers may take advantage of farmers' lack of information to offer lower prices that do not reflect the true value of the produce. Farmers may also incur additional costs, such as transport costs, when seeking out buyers who offer better prices, which ultimately erodes their margins.

The study aimed to determine whether long harvesting times affect farmers ‘potato production. Therefore, findings reveal that long harvesting times affect their potato production. One of the primary challenges that smallholder farmers face during the harvest season is accessing the necessary equipment and tools. As indicated by Degebasa (2019), with limited capital, most farmers must rent or borrow tools, such as harvesters, to aid in the harvest process. This process increases the transaction cost of production since most smallholder farmers' bargaining power is low, leading to high rental prices for the equipment. Moreover, this equipment is often not readily available within the local community, making it challenging to access it in time for the harvest season.

Another challenge of the long potato harvest time is the tedious manual labor required in sorting and packaging the potatoes for sale. Sorting involves removing defective potatoes, damaged ones, rotten ones, and any other potatoes that do not meet the market's quality requirements. It requires significant time and effort, often

being carried out in the fields under harsh weather conditions. Packaging, on the other hand, requires the farmers to pack the potatoes in clean and sturdy bags.

CHAPTER SIX

CONCLUSION AND RECOMMENDATIONS

6.1 Introduction

This chapter present the conclusion, and recommendations based on the findings of the study.

6.2 Conclusion

This study assessed the impact of transaction costs on smallholder farmers' potato production in Tanzania. Specifically, the study aimed to determine the impact of input costs on smallholder farmers' potato production in Kigamboni. The study concludes that input costs have a significant impact on smallholder potato farmers in Tanzania. High input costs, such as seeds, fertilizers, and pesticides, increase the cost of production, thereby reducing profits. This leads to reduced investment in farming activities, low productivity, and poor-quality crop yields, all of which impact farmers' income and livelihoods.

Also, the study aimed to examine the impact of financial support on smallholder farmers' potato production in Kigamboni. Financial support has a significant impact on smallholder farmers' potato production in Tanzania. Access to credit facilities and other financial resources is vital for smallholder farmers to improve their potato production and income levels. Financial support enables farmers to acquire improved seed varieties, fertilizers, pesticides, and other inputs that can improve the quality and yield of their potato crops. Also, financial support can promote the adoption of sustainable farming practices, such as crop rotation and conservation agriculture that are crucial for long-term food security and environmental sustainability. However,

there are still significant challenges that limit smallholder farmers' access to financial resources, including the fact that the loan collateral is not affordable, the total days spent processing credit are not short, the loan repayment period is not affordable, and the interest rate from the lender is not affordable.

Moreover, the study aimed to determine the impact of the risks associated with potato production on smallholder farmers in Kigamboni. The study concludes those rainfall variations, diseases, accidental fire, an unstable price in the market, and long harvesting times are the major risks. It indicates whether rainfall variations, diseases, accidental fire, an unstable price in the market, and long harvesting times affect their potato production.

6.3 Recommendations

The study recommends that;

Smallholder farmers can reduce input costs by using locally available inputs that are affordable and accessible. Efforts should be made to promote the use of local inputs such as organic matter, compost, and manure to reduce the cost of inputs.

Smallholder farmers face financial constraints that limit their ability to purchase inputs. Providing access to credit can help them to acquire inputs such as seeds, fertilizers, pesticides, and equipment. This can be achieved through partnerships with financial institutions, NGOs, and government programs that provide credit at affordable rates.

Smallholder farmers can come together to form cooperatives to pool their resources and purchase inputs at a lower price. Cooperatives can also help to negotiate better

prices for their produce, leading to greater profits for farmers.

The government can support smallholder farmers by providing subsidies to reduce input costs. This can include subsidies on seed, fertilizers, and pesticides. However, the subsidies should be targeted to reach smallholder farmers who are most in need to avoid distorting the market.

Smallholder potato farmers in Tanzania face significant risks related to weather, pests, and diseases that can have catastrophic effects on their harvests. Therefore, it is essential to introduce crop insurance programs that can protect farmers against these risks. Smallholder farmers need access to extension services that provide them with information on best practices, new technologies, and advanced farming techniques. The government should strengthen existing extension services and create new ones to help farmers mitigate risks associated with potato production.

6.4 Areas for Further Research

Other studies should be done on the impact of intermediaries on transaction costs in potato production. Investigating how intermediaries such as traders, brokers, and commission agents impact transaction costs in the potato value chain and how these costs influence profitability for farmers This study can help identify interventions that can make these intermediaries more efficient and beneficial for farmers. Also, other studies should be done about the role of group formation and aggregation in reducing transaction costs. Considering how transaction costs affect farmers who work in groups or as aggregators. The study can examine the extent to which group

formation can help smallholder farmers overcome transaction costs, particularly in reducing communication, transport, and coordination costs.

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APPENDICES

APPENDIX: QUESTIONNAIRE TOSMALLHOLDER FARMERS

Dear respondent,

I am **Shaaban Onga**, a student at the Open University of Tanzania, pursuing a Master's degree in **Economics**. This questionnaire is designed to collect information on the "***Impact of Transaction Costs on Smallholder Farmers of Potatoes Production in Tanzania: A Case Study of Kigamboni Council***". The information obtained will only be used for academic purposes and will be treated with the utmost confidence. You are asked to complete this questionnaire as honestly and objectively as possible. Note that you are not required to indicate your name anywhere on the questionnaire.

Questionnaire No. [ ]

SECTION A: DEMOGRAPHIC DETAILS

Please tick (✓) the appropriate answer of the below questions;

1) Gender of the respondent:

Male	
Female	

2) Education level

Primary	Secondary	Tertiary

3) How long have you been in operation?

Less than 3 years	Between 3 – 5years	More than 5 years

4) Land ownership?

Rented/Hired	Owned

5) Forms of loans received

a) Cash [ ] b) Input form [ ] c) Both cash and input [ ] d) None [ ]

6) Potatoes production in three years (Number of baskets in 20 litres)

2020	2021	2022

SECTION B: INPUT COSTS

For each statement below put a tick (√) to state your level of agreement or disagreement (Strongly Agree, Agree, Neutral, Disagree, Strongly Disagreed).

	Statement	**Strongly Agree**	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**
a	The amount used to hire land is affordable					
b	The amount used to buy fertilizer is affordable					
c	The amount used to buy seeds is affordable					
d	The amount used to hire labour is affordable					
e	The amount used to pay for transportation of inputs is affordable					
f	The amount used to pay for transportation of harvests is affordable					

SECTION C: FINANCIAL SUPPORT

For each statement below, put a tick (√) to state your level of agreement or disagreement (Strongly Agree, Agree, Neutral, Disagree, Strongly Disagreed).

	Statement	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
a	The loan collateral is affordable					
b	Total days spent processing credit are short					
c	The loan repayment period is affordable					
d	There are other undocumented costs associated with securing credit					
e	The interest rate from the lender is affordable					

SECTION D: RISKS ASSOCIATED

For each statement below, put a tick (√) to state your level of agreement or disagreement (Strongly Agree, Agree, Neutral, Disagree, Strongly Disagreed).

	Statement	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
a	Rainfall variations					
b	Diseases					
c	Accidental fire					
d	Unstable price in the market					
e	Long harvesting time					

SECTION E: POTATOES PRODUCTION

For each statement below, put a tick (√) to state your level of agreement or disagreement (Strongly Agree, Agree, Neutral, Disagree, Strongly Disagreed).

	Statement	High	Medium	Low
a	Potatoes production in 2020			
b	Potatoes production in 2021			
c	Potatoes production in 2022			

THANK YOU FOR YOUR TIME AND COOPERATION

APPENDIX 2: RESEARCH CLEARANCE LETTER

THE UNITED REPUBLIC OF TANZANIA

MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY

THE OPEN UNIVERSITY OF TANZANIA

Ref. No OUT/ PG202087550 **21st July, 2023**

District Executive Director (DED),
Kigamboni Municipal Council,
P.O. Box 36009,
DAR ES SALAAM.

Dear Director,

RE: RESEARCH CLEARANCE FOR MR. SHAABAN ONGA, REG NO: PG202087550

2. The Open University of Tanzania was established by an Act of Parliament No. 17 of 1992, which became operational on the 1st March 1993 by public notice No.55 in the official Gazette. The Act was however replaced by the Open University of Tanzania Charter of 2005, which became operational on 1st January 2007.In line with the Charter, the Open University of Tanzania mission is to generate and apply knowledge through research.

3. To facilitate and to simplify research process therefore, the act empowers the Vice Chancellor of the Open University of Tanzania to issue research clearance, on behalf of the Government of Tanzania and Tanzania Commission for Science and Technology, to both its staff and students who are doing research in Tanzania. With this brief background, the purpose of this letter is to introduce to you **Mr. Shaaban Onga, Reg. No: PG202087550)** pursuing **Master of Science in Economics (MSc-ECONOMICS).**

We here by grant this clearance to conduct a research titled **"Impact of Transaction Costs on Smallholder Farmers of Potatoes Production in Tanzania: A Case Study of Kigamboni Council"**. He will collect his data at your area from 24th July to 30th August 2023.

4. In case you need any further information, kindly do not hesitate to contact the Deputy Vice Chancellor (Academic) of the Open University of Tanzania, P.O.Box 23409, Dar es Salaam. Tel: 022-2-2668820.We lastly thank you in advance for your assumed cooperation and facilitation of this research academic activity.

Yours sincerely,
THE OPEN UNIVERSITY OF TANZANIA
Prof. Magreth S.Bushesha
For: VICE CHANCELLOR

THE UNITED REPUBLIC OF TANZANIA

MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY

THE OPEN UNIVERSITY OF TANZANIA

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Yours sincerely,
THE OPEN UNIVERSITY OF TANZANIA

Prof. Magreth S.Bushesha
For: VICE CHANCELLOR