AFRICA UNIVERSITY

(A United Methodist-Related Institution)

DETERMINANTS OF SMALLHOLDER TOMATO FARMERS' PARTICIPATION IN HIGH-VALUE MARKETS IN SHURUGWI, ZIMBABWE

BY

CLEMENT ZVOMUYA

A DISSERTATION SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS OF THE DEGREE OF MASTER OF SCIENCE IN AGRIBUSINESS MANAGEMENT IN THE COLLEGE OF HEALTH, AGRICULTURE AND NATURAL SCIENCES

2022

Abstract

The purpose of the study was to identify the determinants of smallholder tomato farmers' participation in high-value markets in Shurugwi, Zimbabwe. In this study, 156 smallholder tomato farmers derived from a population of 2500, with 57 females and 99 males were involved in the study. Questionnaires were administered through direct contact with the respondents. Data were analysed through descriptive and inferential statistics using Statistical Package for the Social Sciences. The study indicated that there is a relationship between socio-economic factors such as age, sex, formal education level, household size, and access to markets. The study concluded that an increase in the size of the household had a negative influence on access to markets. This is because the larger the household, the more options for alternative income and reduced reliance on tomato marketing. This showed that an increase in household size had a reduction in the likeliness to participate in high-value markets. Education for the head of the household had a negative effect showing that the more educated the head of household, the less likely they were in accessing high-value markets. The price of tomatoes, quality of roads, distance to markets, local council tax fees, and cost of transportation all had a negative influence and was significant in influencing farmers to access markets in the study area. Poor road networks are affecting the ease of doing business in the district and they are getting worse due to the effect of rains and poor maintenance. Gender differences also showed significance in accessing farmers with men being noted to have better access to high-value markets than women. The study observed that access to cold chains and market information was not significant in accessing markets. Recommendations include the formation of tripartite relationships between government, private sector, and farmer groups as critical in addressing infrastructural-related issues related to transportation and logistics. The impact of Covid-19 was also realized as a hindrance especially due to travel restrictions. There is a need for collaborative efforts for the government and private sector to promote market systems development for tomato production at the local level. Strategies such as tomato contract farming and the creation of tomato production hubs or value chain processing centers will be most ideal. Given the increasing participation in artisanal mining, incentives for participation in the tomato value chain can be developed through infrastructure development in partnership with institutions such as the Agricultural and Rural Development Authority, Agricultural Marketing Authority, Zimbabwe Irrigation Technology Centre European Union improving water conveyance systems in irrigation schemes. More studies need to be carried out to investigate other areas such as profitability analysis of the tomato value chain to develop highly efficient production methods, the implication of Command Agriculture on horticultural production, and evaluating the quality of Extension Services in horticultural crops production.

Key words: Access To Markets, Smallholder Farmers, Tomato, Value chain, Shurugwi.

Declaration

I declare that this dissertation is my original work except where sources have been cited and acknowledged. The work has never been submitted, nor will it ever be submitted to another university for the award of a degree.

Clement Zvomuya   25 November 2021

  Students Full Name   Signature (Date)

Dr. K. Mukumbi   KM 29 November 2021

Main Supervisor's Full Name   Main supervisor's Signature (Date)

Copyright

No part of the dissertation may be reproduced, stored in any retrieval system, or transmitted in any form or by any means for scholarly purposes without prior written permission of the author or Africa University on behalf of the author.

Acknowledgments

Dedication

This research is dedicated to my wife Irene and three daughters Nadine, Nelani, and Nadège for supporting and bearing with me during this whole period of study, my mother for all the upbringing and always being supportive throughout my life.

The research is also dedicated to Africa University's fourth Vice-Chancellor, Professor Munashe Furusa, who passed on in January 2021 and was buried in Shurugwi. This study becomes the first to be done in Shurugwi after his death and therefore dedicated to his industrious academic life.

List of Acronyms and Abbreviations

ADB   African Development Bank
ADP   Agricultural Development Projects
AGRITEX   Agricultural Technical and Extension Services
AHM   Agricultural Household Model
ANOVA   Analysis of Variance
ARDA   Agricultural and Rural Development Authority
AMA   Agricultural Marketing Authority
CBZ   Commercial Bank of Zimbabwe
EU   European Union
FAO   Food and Agriculture Organization of the United Nations
FFVs   Fresh Fruits and Vegetables
FO   Farmers' organization
GDP   Gross Domestic Product
GOZ   Government of Zimbabwe
ICT   Information and Communication Technologies
NGO   Non-governmental Organization
OLS   Ordinary Least Square
RBZ   Reserve bank of Zimbabwe
RUM   Random Utility Model
SMEs   Small to Medium Scale Enterprises
SPSS   Statistical Package for Social Scientists
UNDP   United Nations Development Programme
USD   United States Dollar
VAT   Value added tax
ZFU   Zimbabwe Farmers' Union
ZIMRA   Zimbabwe Revenue Authority
ZITC   Zimbabwe Irrigation Technology Centre
ZSA   Zimbabwe Standards Association
ZADT   Zimbabwe Agricultural Development Trust
ZIMSTAT   Zimbabwe National Statistics Agency
ZimVAC   Zimbabwe Vulnerability Assessment Committee
ZWL   Zimbabwean Dollar or Z$

Definition of Key Terms

Agriculture	The science or practice of farming, including cultivation of the soil for the growing of crops.
High-Value Markets	Formal commercial markers formed out of exports and large retail or supermarket chains. These are the mainstream markets out of which informal markets are formed
Household	One or several persons who live in the same dwelling and share meals. It may also consist of a single-family or another group of people
Participation	Active engagement in the crop value chain.
Profitability	The degree to which a business or activity yields profit or financial gain in relation to the use of profitability analysis ratios.
Smallholder Farmer	Smallholder farmers are defined as communal or peri-urban farm households that own land and cultivate less than two hectares of land for combined subsistence and commercial.
Small To Medium Enterprises	A small business is one with six to 40 employees, an annual turnover of USD 50 000 to USD 500 000, and assets valued at between USD 50 000 to USD 1 million.
Socio-economic	A relationship of how economic characteristics or activities are affected and shaped by social processes.

Table of Contents

List of Tables

List of Figures

List of Appendices

CHAPTER 1 INTRODUCTION

1.1. Introduction

Zimbabwe's economy is driven largely by agriculture. Since the agrarian reform, there was the increased participation of smallholder farmers in livestock and crop production. Smallholder farmers are defined as communal or peri-urban farm households that own land and cultivate less than two hectares of land for combined subsistence and commercial. According to the Comprehensive Agricultural Policy Framework (2012), horticultural crop production increased from USD 75 million in 2012 to USD 150 million per year by 2015. This sector is dominated by large commercial farmers, smallholder farmers participating in the market system. Zimbabwe's agricultural sector is mainly driven by smallholder farmers. They can contribute to food security, employment creation, redistribution of wealth, and a conduit for industry growth through diversification activities. The number of smallholder farmers participating in horticulture has been on the decrease in the past 5 years due to business viability in the horticultural sector and observed in the Comprehensive Agricultural Policy Framework (2012).

The Government of Zimbabwe through the Reserve bank of Zimbabwe, the Ministry of Industry, Commerce, and Enterprise Development, and various financial institutions such as Agribank, African Development Bank (ADB), Commercial Bank of Zimbabwe (CBZ) have introduced various forms of financial products to support smallholder farmers in horticulture production and marketing. The Zimbabwe Agriculture National Policy draft (2018) highlights that the agricultural sector, in general, has enjoyed government input support such as the Command Agriculture, while farmers producing for exports have been

awarded export incentives for their produce.

The policy (Zimbabwe Agriculture National Policy draft, 2018) further reiterates that Zimbabwe's economy is sustained by commercial and smallholder farming. However, Mwakiwa *et al.,* (2016) showed low smallholder participation in high-value horticulture markets some of the Small to Medium Scale Enterprises (SMEs) formed barely are registered as suppliers for high-value markets. Those that do, still will not deliver their products to the markets, even though there is still a shortage of horticultural products for both the domestic and export markets.

The Zimbabwe Agriculture National Policy draft (2018) highlights that the marketing of produce assists smallholder farmers in accessing income in the form of profit to improve their livelihood. This contributes to poverty reduction while improving farmer productivity through reinvestment in agriculture. Furthermore, the policy further identified that farmers face limited or restricted access to markets. The policy further posits that farmers have access to means of production such as labor, inputs land, technical knowledge, supported funding from the government, but still, their production is affected by failure to reach high-value markets. This leaves farmers still in the poverty cycles, while productivity reducing because of the economic downturn because of rising inflation as observed by Mhlanga (2020). The emergence of Covid-19 has seen disruptions in food systems value chains arising from travel restrictions that prevented adequate agricultural preparations. Mhlanga and Ndhlovu (2020) note that Covid-19 significantly affected the marketing of food crops. Informal markets were destroyed by the government and local

municipal authorities, leaving smallholder farmers with a need for social assistance. Farmers get to a stage where they fail to produce minimum demand levels and, in some cases, fail to meet household consumption needs (Mhlanga, 2020)

Access to high-value markets is a significant component for smallholder farmers as their produce can fetch high-value in the various markets. Kothari (2014) identified access to markets as an essential aspect in improving the welfare of farmers, while Omiti *et al.,* (2009) attributed that some of the constraints for farmers face are performing in high-value markets.

1.2. Background to the Study

The participation of smallholder farmers in the market system has a domino or ripple effect on the larger economy. It offers the majority of rural farmers access to food and income while creating other opportunities in the value chain. The existence of market systems, therefore, offers greater opportunities in the growth of horticulture improving the quality of life for smallholder farmers. However, access to market triggers plays a significant role in farmers' participation. As already alluded agriculture is one of the main economic drivers in Zimbabwe and Sub-Saharan Africa as a whole, with smallholder farmers being the main participants observed by the Zimbabwe Agriculture National Policy draft (2018). According to ZIMSTAT (2019), 70 % of the population participates had their livelihood anchored in agriculture, with 33 % of the national labour involved in agriculture.

Smallholder farmers depend largely on unstructured informal markets. Usually, these markets rely on information asymmetry. The market structures are weak with poor linkages. Farmers are reluctant to access high-value markets that offer high revenue. Smallholder farmer participation in high-value markets has been significantly low due to a variety of challenges. Since most farmers live in rural remote areas with poor road networks and lack of access to market information. It is also noted that changes in the horticultural sector such as best practices in organic farming techniques affect the preference of products from uncertified farmers.

Government policy since 1980 (the year Zimbabwe became Independent) has been put in place to promote smallholder farmers' participation in production. Polices to create an enabling environment, improve production quotas, viability and boost economic outcomes from the horticultural sector. Participation of smallholder farmers, therefore, is key in making the sector highly profitable and therefore attractive for investment in the future.

Climate change has added a significant barrier to productivity for farmers who rely on rainfall patterns. Smallholder farmers have realized a reduction in yield, or surplus and therefore face the challenge of relatively high cost in transactions. Smallholder farmers target their output due to the expected consumption patterns usually in the domestic market and rarely in the international or export markets. These decisions are reached through the available information on the market system, take-off prices, and the distance to the various markets.

In pursuit to secure supplies, accountability, and value for money demands have brought about stiff requirements in the horticulture market actors. The processes require a high

level of vetting for quantity, quality, and ensuring that the real producer is the one who delivers the products. This is aimed at cutting off the participation of middlemen who take advantage of information asymmetry to trade on the horticulture markets. Farmer organizations and cooperatives also facilitate farmers' linkages so as the organize the industry, meet the demand quantities, and reduce transaction costs.

Horticulture production in Zimbabwe plays a significant role in contributing to the economy as boldly declared by the Zimbabwe Agriculture National Policy draft (2018). The products are used for household consumption, domestic and export marketing. With the new trends of healthy living, more people are shifting from meat to vegetables creating significant growth in future horticulture demand. The amount of research on horticultural production in Zimbabwe is still low regarding the nature of markets, profitable products, and access to these markets. However previous research has focused on production, barriers to marketing, quality for export markets as well and economies of scale in horticulture.

Horticulture is one of the common practice areas in agriculture. The Zimbabwe Agricultural Sector Survey (2019) showed that a total area of 25.286 million hectares is held by 1,321,800 farmers, showing 78.6 % of land ownership. An estimated 12 % of the land is covered under horticulture in Zimbabwe 2017-18 was anticipated to contribute to the GDP of 7 %. This was still at the back of a decline from the report made by Chigusiwa *et al.*, (2013). These considered farmers who will be in the production of crops such as tomatoes, cabbages, carrots, and green peppers. Most of the crops are planted during the period April – September while others were covered during the October – March period.

This, therefore, shows that horticulture output reaches significant levels to provide revenue from international markets and subsequently income for the workers in the sector.

Food safety and quality of tomatoes take center stage in marketing. Tomatoes require cold chain facilities so that they reach the markets in a fresh state to attract better pricing. Njaya (2014) highlighted the fact that shelf life and perishability of products are key issues to consider in marketing fruits and vegetables. Packaging and storage facilities become a critical factor, which many smallholder tomato farmers do not have.

Smallholder tomato farmers in general have been actively involved in the production and marketing of tomatoes for local formal and informal markets market as well as export market in SADC region as well as in European markets. The Zimbabwe Agricultural Sector Survey (2020) estimated 40% by value of national exports in fruits and vegetables. Smallholder tomato farmers actively participate in production markets, especially informal markets, which are not sought after in terms of quality, packaging, and other characteristics (Bernstern et al., 2011). The informal market mainly has direct marketing to consumers, either on the farm or in informal street markets in rural and urban areas, and local or municipal authorities markets in large urban areas. This means that most of the tomatoes are intended to be sold in low-quality markets. However, there is a clear lack of knowledge about the high-value markets for smallholder tomato farmers and the main driving force. Therefore, this research seeks to fill this gap. Research findings will be directed in guiding rural development strategies that focus on the improvement of quality of life for smallholder farmers.

1.3. Statement of the Problem

The Zimbabwe Agriculture National Policy draft (2018) identified that smallholder farmers have been increasing participation in horticulture access to profitable markets has been a challenge. Farmers have suffered market failures resulting in loss of possible income. Tomato marketing has been known to be heavily involved with middlemen as identified by Chigusiwa *et al.*, (2013). The increase in the participation of middlemen shows a gap that exists between smallholder farmers and high-value markets. The researcher, therefore, sought to establish the significant hindrances to high-value markets that could be used to analyze to recommend strategies or growth in the sector. This study is aimed to anchor the most on challenges that prevent smallholder participation in horticultural growth. The assessment to be made in this paper is to compare the challenges in accessing high-value markets.

1.4. Research Objectives

The specific objectives of the study were:

i.   To analyze the socioeconomic characteristics of the individual smallholder tomato farmers that influence access to markets in Shurugwi.

ii. To study the business logistics factors affecting access to tomato marketing in high-value markets.

iii. To evaluate whether male and female smallholder farmers have equal access to high-value tomato markets.

1.5. Research Questions

The research was designed to focus mainly on the horticultural sector. Sector-specific data especially on access to markets for smallholder farmers' access to high-value markets is relatively difficult to find in its most aggregated form. The research sought to answer the following broad questions:

i. What demographic socio-economic factors affect individual smallholder tomato farmers' access to high-value markets.

ii. What specific business logistical factors influence or hinder smallholder farmers in accessing high-value markets?

iii. Do male and female smallholder farmers have equal opportunities in accessing high vale tomato markets?

These questions if answered will give broader thinking in the line of looking at horticulture more strategically and developing a growth mechanism. It is envisioned that a private sector driven horticulture growth model where high commitment from the private sector and government will be given specifically to smallholder farmers to improve growth, access to information to grow and match the potential that horticulture must sustain the economy and take Zimbabwe back to the days of being the breadbasket of SADC.

1.6. Assumptions/Hypothesis

High-value market access has many variables such as socio-economic patterns, transport and logistics, transaction costs, demand, and supply factors. However, underlying factors such as climate change, implications of Covid-19 on horticulture production, quality, and pricing distortions can be explored. The research assessed the following hypotheses:

i. H_0- There is no relationship between socio-economic factors and access to high-value markets

H_1- There is a relationship between socio-economic factors and access to high-value markets.

ii. H_0- Gender does not affect accessing the high-value market.

H_3- Gender influences accessing the high-value market.

Assumptions of the Study

The horticultural sector has a diverse environment that is affected by political, economic, technological, social, legal, ecological, and governance factors. Carrying out research of this nature requires a careful approach to ensure success. For this study to be flawless and succeed, several assumptions were made:

i.   Clearance for the study was issued by the University and the relevant Government officials.

ii. The participants identified for the study were, in general, willing to share information openly and freely. This increased the authenticity of the study and contributed towards a credible report that can be relied upon.

iii. Some of the smallholder farmers had trading records showing volumes and sales recorded in the high-value markets, while others relied on memory recall, which would be verified by their spouse or children who would participate in the interviews

iv.   Local trading currency was equated to the USD using the interbank rates quoted for that trading period. This was to ensure consistent data analysis.

v.   The study participants identified were agreeable in responding to interview questions.

vi.   The questionnaire and interviews collected sufficient data to answer the study objectives and obtained usable data from the respondents.

1.7.   Significance of the Study

The study examined the current issues that are affecting smallholder farmers that stifle growth and make access to markets difficult. The study, therefore, had a lot of relevance in the current business environment.

The study was of paramount benefit to the researcher, Africa University, the Ministry of Lands, Agriculture and Rural Settlement, Agriculture Marketing Authority, and other organizations that support smallholders in horticulture.

Theoretical

i.   Establishing the barriers that affect smallholder access to high-value markets

ii. Paving the way for further research in a new smallholder high-value markets access supported by government, private sector, and policy organization through review of policies and procedures that enable market access.

iii.   Raising awareness on investors and other smallholder organizations in improving the playing field and reducing the barriers that cause challenges in accessing markets.

iv.   Creating a new body of knowledge and arguments in designing appropriate strategies in improving access to high-value markets.

To the researcher

i.   The researcher obtained an in-depth understanding of tomato commodities trading, which in turn added value to existing knowledge.

ii.   The researcher fulfilled the requirements of study towards a Master's in Agribusiness Management.

iii.   Creating a platform for further analysis of factors prohibiting access to markets for smallholder farmers in tomato and other agriculture-related enterprises.

To the focal sector

Ministry of Lands, Agriculture, and Rural Settlement

i.   Analysis of the barriers in smallholder participation in high-value markets. This will contribute to discussions within the horticulture sector to review constraints for smallholder farmers.

ii.   Developing standards guidelines in improving participation of smallholder farmers in tomato production and other sectors in agriculture.

To other smallholder farmers

i.   The study created an increased analysis of business participation. This was also in consideration of the fact that business macro-environment factors such as cash shortages and increasing cost of financial capital.

ii.   The study challenged the structure in the current trends in tomato production and gave suggestions on the suitable scenarios that improve horticulture output and participation.

iii.   The study sought to provide knowledge on improving the level of participation. This contributed towards arguments for improved infrastructure, zoning, and targeted outputs.

A more sensitive approach to the horticulture value chain in different sectors. The current model showed that it does not cater to the uniqueness of horticulture as there are variables in the region, location to big cities, market responsiveness, and others. Smallholder farmers starting, established, and participating in different sectors are bunched together and compete the same way.

  1.8.   Delimitation of the Study

The area of study was observed to be complex and diverse. Many variables showed a great need to be investigated to understand factors that affect smallholder participation in high-value markets. The study focused on several issues that are feasible in relation to the level of the study, time allocation, resources, and the current level of expertise. The study was therefore limited to the following categories.

Theoretical

The study analyzed smallholder farmers' participation in the domestic high-value markets in Shurugwi. Smallholder farmers were defined as communal or peri-urban farm households that own land and cultivate less than two hectares of land for combined subsistence and commercial. The smallholder farmers that were being targeted for this study were those that have been participating in production between 2014 and 2020. These smallholder farmers should have participated in the horticulture value chains in tomatoes.

Physical

Smallholder farmers targeted were operational within Shurugwi District, listed as operators in district ZFU or AGRITEX farmer organizations records.

Time

The study was carried out from March 2021 to April 2021. The final report was created and compiled and submitted to the university in May 2021.

1.9. Limitation of the Study

The list of smallholder farmers received from Zimbabwe Farmers Union included businesses that cannot evaluate if the farmers were operational, with outdated details, missing contact numbers in some cases, some of the names given were of deceased farmers. The respondents were not willing to give intrinsic details of their business with the concern of how the data will be used for. However, through sharing the objectives of the study and good rapport, they would eventually give the details. The head of households in some instances was not available to respond to questions and would then delegate the

spouse to participate in the interview. The use of English for the data collection tool may affect other farmers with low literacy levels. However, a translation guide in the Shona language was developed to ensure consistency. The rainy season left a trail of eroded roads that were inaccessible roads making traveling to some areas difficult. The increasing cases of Covid-19 affected access to farmers, and also the implications of lockdowns delayed the data collection procedures.

1.10. Organization of the Study

Chapter one introduced the study and showed the problem statement and the background of the study. The focus of the study was to analyze smallholder farmers' participation in the domestic high-value markets in Shurugwi. The study aimed to establish the key factors that affected smallholder farmers from accessing high-value horticultural markets.

Participation was measured from a perspective of regular deliveries, contracting with key high-value market actors, evidence of transactions such as purchase orders, invoices, receipts, good delivery notes, and other notes

Chapter two reviewed literature from various authors across the world. The literature was selected mainly from sources for smallholder farmers in the horticulture business context. However, a critical point to note was the inadequate literature on smallholder farmer participation in Zimbabwe. The volume of literature has been on a drastic decline from the late 1990s to the 2000s. This forms the basis of this thesis as it aimed to contribute literature in this regard.

Chapter three looked at the research design and how data collection, arrangement, processing, and analysis will be conducted. It showed the steps that were taken to sample the data and the various sources of data that were used. Research tools were identified showing techniques of how the data was protected and validated.

Chapter four showed the results of the research, highlighting key discussions to explain the trends and patterns noted in the research. It also displayed data in various presentation forms such as tables and charts to make it simple to understand and comprehensible by various audiences. The chapter showed the quantitative aspect of this research, answering the focus for this research as explanatory research.

Chapter five summarized the findings from the results identified in chapter four. Summary of conclusions and recommendations to answer the research questions and statements of hypothesis are presented here. This formed the action part of the research to the target audiences as it gives evidence for changes and adjustments or lobbying to government, private sector, and the horticultural industry, and those who support smallholder farmers.

1.11. Summary

This chapter introduced the background of the study which is to analyze the determinants of smallholder farmers' participation in high-value markets in Shurugwi, Zimbabwe. The

chapter also sets the stage for the delimitation of the study. Key terms were identified and

defined so as the maintain a consistent understanding. Ethical considerations were also

highlighted to ensure that the rights and privacy of research participants are protected.

CHAPTER 2 REVIEW OF RELATED LITERATURE

2.1. Introduction

The purpose of the research study was to analyze the determinants of smallholder farmers' participation in high-value markets in an environment that is highly volatile and liable to risk. It went further to access the challenges that smallholder farmers face in accessing the high-value markets, channeling a platform for discussion, review of policy, and industry environment to create an enabling environment for participation for smallholder farmers.

Most of the literature has focused on smallholder farmer participation in open market systems, and more typically in an urban or peri-urban setup. In Zimbabwe, most of the researchers have focused on smallholder farmers in natural regions 1 and 2 largely. However, a gap was noted in smallholder farmer participation in regions 3, 4, 5. Additionally, there was a noted decline in the volume of literature in horticulture post the 2000 era, coinciding with the onset of the agrarian reform. Therefore, this research is creating a focus on the newly resettled smallholder farmers.

2.1.1. Market participation approach

There are two perspectives to view market participation. The first instance is where here smallholder farmers who produce and make an informed decision to decide to be buyers or sellers. The second instance is when smallholder farmers decide on how much they would like to participate in the market as buyers or sellers. The conceptual structure of the

market is therefore formed and creates an econometric model that can be analyzed using models such as the Heckman (1976) Two-Stage Model approach. This model has been seen to be effective in applying agriculture models in evaluating market participation. This model is appropriate for use in a country like Zimbabwe where market systems are weak or developing. Holloway *et al.,* (2005) Bellemare and Barest (2006) used this model and found it to be useful.

Socio-economic factors, however, play a significant role in deciding the extent of market participation. Some factors are so strong, they even lead to deciding to produce or not. It is interesting to note however that studies have focused on a household that produces and ignores those that do not produce and therefore missing the opportunity to investigate the issues in smallholder farmers that do not participate in a certain market system. In reviewing the economic lives of smallholder farmers, Rapsomanikis (2015), showed that smallholder livestock farmers made an economic decision to own dairy cows and thereby showing a willingness to participate in the market system. Studies should be open to looking at smallholder farmers that are not participating in the tomato market system to capture their views to reduce bias in the study.

2.1.2. Market participation determinants

In a study of smallholder market participation in Mozambique, Heltberg and Tarp (2002) also used the Heckman (1976) Two-Stage Model approach to evaluate the equation of declining market share and market value of food crops (as a group), economic crops (such as groups), and the total value of crop sales. Factors that had a significant impact on market

share included household size, animal motivation, average maize yield, family head age, climate risk, transportation ownership, and infrastructure. Explanations for changes in the sale of food crops or cash crops are not very credible, and the authors acknowledge that group sales of food or cash crops can obscure the causal mechanisms involved in individual crop decisions. Boughton *et al.,* (2007) used the same approach to examine farmers' participation determinants of the cotton and tobacco farmers in Mozambique's Zambezi Valley and tested the potential for land tenure and educational attention for smallholder tobacco owners. Participation in agricultural contracting programs is strongly associated with the contribution of household factors and alternative income opportunities.

In a study on the involvement of smallholders in the staple food market in sub-Saharan Africa, *Jayne et al.* (2010) found that their total market share was very low. Jayne *et al.* (2010) found that the top 2 % of commercial farmers accounted for about 50 % of the maize sold in markets in Kenya, Mozambique, and Zambia. Ellis (2005) also shows that farmers in sub-arid regions of Africa have a proportion of sugarcane in market production. Further compounding this challenge is evidence of the involvement of smallholder farmers in horticulture and dairy products. Farmers are moving away from producing staple foods, contributing to a decline in staple yields as reported by Olwande and Mathenge, (2012). This is due to staple food prices and low prices and farmers' desire to increase yields. Thus, there seems to be a different trend in demand and supply: demand trends that may create more opportunities for staple foods in the domestic market and brewing trends, which reflects the farmers' interest in shifting away from lower value food

crops (Bellemare and Barret, 2006). Jayne et al. (2010) concluded that a relationship exists between land tenure, market share, and income. They found that most smallholder producers did not sell cereals and were net buyers of cereals. Land tenure also has high relevance to income, including crop income and livestock income. This shows that poor countries do not benefit from markets as well as resource-rich countries. An interesting finding, however, is that even the country's poorest households depend on crop production for a significant amount of household income.

Some studies have been conducted to understand marketing constraints and the types of interventions that can overcome these limitations. Barrett (2008) emphasized the importance of identifying location constraints, which tend to affect community-level participation over family-level constraints that affect household involvement in a particular location. Bijman *et al.,* (2007) observed that among the types of constraints, others distinguish between transaction costs, risks, and resources such as skills all of which can be expressed at the household level. Poulton *et al.,* (2006) posited that an important point is that interventions may vary for different product chains. For example, the investment required in vegetables or timber is different from for crops, due to differences in risk, ability to add value and standards, and so on. Discovering which agricultural product offer the best sales opportunity and marketing revenue is, therefore, an important step in the process of making a profitable investment in high-value crops.

2.1.3. Market type and marketing system

In general, there are three basic types of markets in which value chain projects can be driven. (i) an "unofficial" market that is largely unregulated and often tax-exempt. (ii) A

more regulated "formal" market that works with standard weights and scales and where transactions are negotiated according to a well-defined legal framework. (iii) A structured public market organized by public sector buyers who offer standardized procurement contracts on specific terms (e.g., purchase of a percentage of total smallholder tenders).

2.1.4. Informal market

The informal market is the most accessible market for most small farmers in developing countries. They are called informal because they are outside the tax system and are off the record. According to Gor (2012), the informal market trades more than 80-90 % of the agricultural products in most developing countries, including all agricultural products, roadside sales, village markets, rural assembly markets, and wholesale and retail in major cities. Informal markets are especially important for trading all the products produced by small farmers, including large, inexpensive grains and legumes, as well as high-quality vegetables, fruits, and meat products.

In general, these markets have no formal valuation or traceability, rarely use standard resources, prices are supply and demand, trade cartels, and local customer loyalty to a particular supplier. It is set by any combination of positive and negative features of the informal market.

One of the positive features of the informal market is limited standards. The limited standards mean relatively low post-harvest losses due to repeated processing to achieve high-quality products. This creates a very flexible environment for value proposition and makes these markets attractive to a wide variety of suppliers and buyers. Another positive feature is that the informal market offers manufacturers, wholesalers, and retailers great

revenue opportunities. In addition, Informal multi-vendor market processes and pricing are used as risk management or vendor safety nets.

Negative characteristics of the informal market:

They are nominally controlled by local governments and are powerful in restricting competition, imposing arbitrary downtime fees, and using favors for the benefit of political allies, close relatives, and other relationships. Often run by a trade cartel. Lack of investment and insufficient transparency often leads to overcrowded and unsanitary conditions. Food safety issues are often overlooked, resulting in changing shopping habits for some mid-sized consumers (although most customers are still affordable and cheap in the casual market). There are few modern trading facilities on the market and few markets that have automated systems or operate in a coordinated manner. Lack of business prospects due to market management limits investment and growth.

2.2. Theoretical Framework

Smallholder farmers like any farmer would like to achieve high profits and high returns on investment. This is only logical in business. Smallholder farmers have a unique set of socio-economic attributes and will choose their desired route to market their horticultural produce for various reasons known to them. The framework, therefore, acknowledges that the actions of the farmer are rational to them based on what the farmer perceives to be the method that gives them the highest returns.

The study was based on the random utility model (RUM), which is founded on the assumption that an individual will make a choice that yields the highest utility (Walker, 2002). While the farmers' behaviors are unpredictable toward their choice of the market they will choose, the socioeconomic factors, industry systemic factors, market factors, and business professional behavior factors however are more predictive and can be arranged on a pattern that can be more deterministic.

2.3. Review of Empirical Studies

Kyaw *et al.,* (2018) used econometric models to analyze the factors that influence participation for smallholder rice farmers in Myanmar. The study was aimed at addressing various factors and their relationship in assessing the level of participation for rice farmers. The study used a conceptual framework that analyzed socio-economic factors, institutional and market factors. The study concluded that skills, knowledge, technology, and market factors had a positive relationship and were significant in influencing the participation of farmers and therefore recommended that reforms in rice production need to be addressed to improve production.

In a value chain efficiency study in Tanzania, Kilelu *et al.,* (2017) found that multi-stakeholder participation is key in enhancing the participation of farmers in dairy production. The influence of systems thinking value addition and innovation through ICT was seen as key in improving farmer participation. Hence, if production efficiencies are addressed, products would easily fetch high-performing markets in both the domestic and foreign markets.

Apind *et al.,* (2015) used econometric models in assessing both rural and urban rice producers. The study assessed the impact of socio-economic factors in the analysis of the production capacities of rice farmers in Kenya. Farmers with an enhanced socio-economic status were noted to be higher performers than those with a lower status. Factors such as additional income, market information, and agronomy extension services positively influenced market access.

Mukwevho and Anim, (2014) used econometric models to assess factors that affect cabbage farmers in South Africa in accessing markets. The study found that a significant number of cabbage farmers have challenges in accessing markets. The statistics showed that the differences between the two groups of farmers (those with market access and those without market access) accounted for 77.8 % of the variance in the predicting variables for market access. Farmers who invested in high-quality inputs were noted to have access to markets than those with poor quality crops. This is due to a belief that high-value inputs contribute to better quality crops that are easily marketable. Means of production such as equipment, technology, educations, and skills were noted to play a role in determining the farmers' ability to access markets.

Digal (2011) investigated the role of middlemen in enhancing the participation of smallholder farmers in Tanzania. The study used econometric models to assess the role of technical assistance and access to credit in building the capacity of rural farmers on production. This emphasis was paced with the understanding of changing business

environments and customer needs, and therefore creating a situation where rural farmers need to be equipped with up-to-date knowledge and skills as well as credit to boost production. The study also found that investment in value chain development needs to be improved in the same manner as an investment in production.

2.4. Identification of Gaps

Previous studies in horticulture in Zimbabwe have been on the decline due to the disruptions in the agricultural sector due to the land reform program. The focus and investment in cereal crop production through government-funded command agriculture has also led to the reduction of commercial horticulture production. The tomatoes value chain which is one of the largest value chains in horticulture has been largely ignored in Midlands province. Shurugwi district in Midlands has had few studies carried out showing that the district is not a largely researched area. This study, therefore, aimed at contributing a body of knowledge in horticulture using a case study of tomato production in Shurugwi.

2.5. Conceptual Framework

The factors show the relationships and the extent to which they play a role in determining the participation of smallholder farmers in high-value markets. Figure 2.1 illustrates the key factors that are scrutinized in the study. Socio-economic factors are the attributes for the smallholder farmers. These are age, sex, formal education level, household size, the total produce of horticulture crops, land ownership, industry, and systemic factors including access to extension service, access to roads, availability of cold chains, and membership of a farmer organization. The third set of factors are market factors. These are distance to the market, prices of horticultural crops, and access to market information.

The fourth set of factors are business professional behavior made of tax payments, grading of produce, the currency of trade, repayment period, and transaction costs.
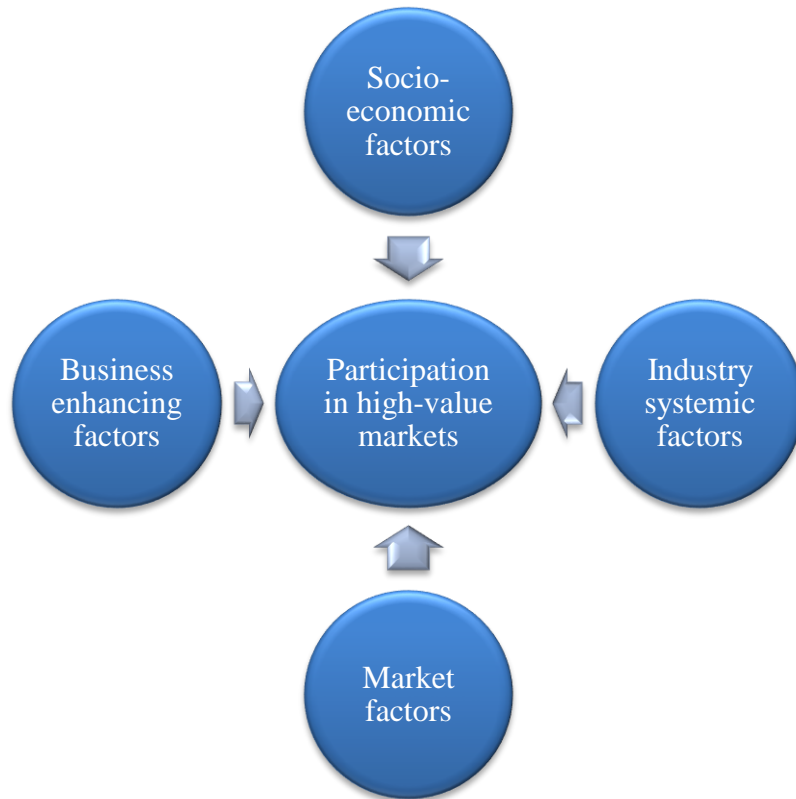
Figure 2. 1 Theoretical framework

Source: Zvomuya (2021) Market participation push and pull factors

2.6. Relevance of the theoretical frame to the study

The theoretical framework formed the basis of analysis for the variables that influenced access to markets. The classification of the factors enabled the quantification of the relationship of the factors in relation to access to markets.

Socio-economic factors

These highlights the characteristics of the farmer such as sex, age, size of household, and level of education. They assisted in defining the farmer, the skills capabilities. Resource

uses can also be analyzed while emphasizing the skills and capability of the farmer. Authors such as Asseffa (2021), Aku *et al.,* (2018), and Apind et al (2015), analysed socio-economic factors and their relationships to market participation. These factors are likely to have a positive or negative influence depending on the size of the investment, quality of output, and size of demand.

Industry systemic factors

These play a critical role in defining the nature of the industry. They assist in identifying the behavior of the industry while shaping the expectations of how smallholder farmers can participate in the sector. Examples for these include cold chains, standards in the value chains, aggregation facilitates, registration for market participants Chamboko *et al.,* (2017) realized the presence of cold chains was critical in enhancing market participation for dairy farmers. This placed an emphasis on how the dairy value chain should be structured to improve productivity. The presence of these factors can act as enablers whole absence can be barriers, making participation difficult.

Business enhancement factors:

These form the enablers that either motivate or demotivate participation. They form industry performance or improvement factors issues, policy provisions, and guidelines. Fischer and Qaim (2012) realized that farmer participation in cooperatives improved the voice of farmers in shaping policy and practice. This motivated farmers as the size in numbers encouraged dialogue to address common challenges. Kilelu et al (2017) realized that a stakeholder approach was key in influencing policy reforms in Dairy Development

in Tanzania. If there is a positive environment with farmer-friendly policies, participation is maximized, while restrictions and negative policies may hinder progress.

Market factors

These provide an analysis of the market's operation structure. Examples include payment processes, demand, and supply chains, quality, and quantities available for trade, price fluctuations, currency, local and export trade. Mukwevho and Anim (2014) noted that demand and supply factors were influenced by the quality of inputs and outputs. Farmers who invested in good quality inputs and crop varieties were observed to have greater access to high-value markets.

All these factors can be analyzed to measure determinates of participation in high-value markets. They allow the researcher to analyze the data to identify the relationships between variables. Econometric models can be used to see the extent of relations to draw the appropriate conclusions in the research.

2.7. Summary

This chapter highlighted key issues relating to the literature relating to smallholder farmer participation in high-value markets. Related empirical literature from across the world was identified and reviewed. Of significant interest was literature from African studies as it was a close fit into the Zimbabwean setting. They were closer and related better with social and economic characteristics.

Gaps were noted however in assessing professional industry expectation, the impact of inflation as well as smallholder farmers' operation in an agrarian revolution environment. This makes this research unique in the sense that it creates an opportunity to formulate new literature in those key limited aspects.

CHAPTER 3 METHODOLOGY

3.1. Introduction

Quantitative data were collected to examine the determinants of smallholder farmer participation in high-value markets. This chapter highlights the processes of how data was generated and processed. It also includes how the design, sampling frame, methods used to identify the sample, the tools, or instruments to be used to collect data, analysis as well as data presentation. The goal of the research was to answer the research objectives as well as to give scientific evidence to prove or disapprove of the predicted hypotheses

3.2. Research Design

The cross-sectional research design was used in this study. This gave the researcher the ability to investigate the factors at the same time while the outcomes of the study can be measured or compared with other previous studies.

The researcher chose to use explanatory research to investigate the extent to which to analyze smallholder farmers' participation in the domestic high-value markets in Shurugwi.

Justification of using explanatory research

Opening to new levels of understanding: Explanatory investigations were usually used to increase the investigator's level of knowledge in the subject that is being investigated. It would have constituted an error to use them to draw up any conclusions; because it does

not gather sufficient data to arrive at any conclusions. Nonetheless, however, it can help a researcher begin to establish cause-and-effect relationships.

Testing a theory: One of the common reasons for carrying out an Explanatory investigation was to check theories or phenomena before they can be adopted in business or the desired field. This was mainly to manage risk.

Providing pinpointers: Explanatory research helped researchers to identify likely causes of observed trends suggested by key opinion leaders. Investigators may decide to investigate to create a shortlist of possible roots to a challenge. Additionally, more in-depth broader studies may then verify what factors are the main contributors to the observed trends.

The flexibility of Data Sources: Explanatory research utilizes secondary data sources from previous literature. Some of the alternative sources used in Explanatory studies include formal structured interviews, case studies, informal discussions, or pilot studies.

Explanatory research is efficient: Investigators may choose to use explanatory investigations to understand terminology and phrases critical to the study. Investigators also use this to identify the best method to approach the research subjects.

3.2.2 Research paradigm

The researcher's point of view fits into the realism paradigm. Quantitative methods were used to collect data and analyzed using statistical and the Heckman Two-Stage Model methods.

3.2.3 Research Methodology

The research used two analysis frameworks, descriptive statistical methods, and the generalized A Probit multivariate model was used to analyze the data for the research.

This constituted a quantitative research methodology. Quantitative data sought to check and validate existing theory and validation using econometric models. In addition, quantitative data analysis gave meaning to a generalized recognized trend and how individual behavior influenced that common trend.

Smallholder farmers have socio-economic factors which are highly unpredictable when deciding which market channel, they chose. However, what was observed is restricted participation in high-value markets, creating a cause-and-effect scenario.

3.2.4 Research Approach

The researcher was inclined towards the abductive research approach. This was because the research was based on a conceptual framework that aimed to test theory and investigate the trend in the behavior of smallholder farmers. The data collected was analyzed to establish key themes and patterns, but also build more theory to update to new trends and change to unique settings.

3.3. Population and sampling

Target Population

The researcher classified the target population for investigation using the delimitation frame. A suitable population was identified for this research. Various sources of data were reviewed also form part of the population.

The target population was identified from 2 500 possible participants of horticultural farmers

Sample Size

The researcher chose to use Slovin (1960) sampling formula for a known population. A population of 2500 gave a sample size of 156, with a 99 % confidence interval and a 10 % margin of error.

$$n = \frac{N}{(1 + Ne^2)}$$

Where:

e is the error tolerance at the desired confidence interval of 99%.

N is the given population.

n =156

Table 3. 1 Sample Size

Subjects	Target population	Sample size	Confidence interval	Margin of error
Number of tomato farmers	2500	156	99%	10%
Total	2500	156		

Justification

The sample size was chosen as it is within the expected standards of Explanatory research. This was consistent with the guidelines as stated by Krejcie (1970). Also given the

resource constraints it allows the researcher to focus on the sample size and be able to gather sufficient data to analyze and compare to answer the research questions.

3.3.1 Sampling techniques

The researcher used a three-step random sampling to further screen the population sample. The first step was to demarcate the areas where tomato production was prominent in Shurugwi District. A list of registers from Agritex and Zimbabwe Farmers Union was then aligned to these areas to ensure fair presentation and coverage across the district. After obtaining the list, the farmers were arranged by the respective wards and farmer groups. Systematic random sampling was used to select the research sample. This was done to ensure that each of the elements selected had an equal mathematical chance of being selected. All the lists were arranged in alphabetical order by name, every third element was selected.

3.4. Data Collection Instruments

Two main data sources were used by a researcher include primary data for analysis and secondary data for comparison and interpretation.

Primary Data

Primary data was collected to meet the specific requirement of the areas for measurement. It allowed the researcher to probe and get more details behind pre-existing statistics and areas of curiosity. Primary data was triangulated with secondary data and placed the research into the Midlands context.

Primary data was obtained from the research participants. The data was collected through questionnaires.

3.5. Model Specification and Analytical Framework

Two methods were used to analyze the results.

i.   Descriptive statistical methods

The data was captured through Kobo Collect mobile data collection systems and analyzed using the Statistical Package for Social Sciences (SPSS) version 26. The data were analyzed using descriptive statistics to assess the socio-economic characteristics of the farmers in Shurugwi District. Characteristics that influence participation in high-value markets were analyzed using statistical methods such as percentages, standard deviation, means, and variances.

ii.   The generalized Heckman Two-Stage Probit Model

The Heckman two-stage equation was estimated using SPSS version 26. This was used to estimate the likeliness and extent of market participation for tomato farmers Shurugwi district. This focused on the econometric analysis of the characteristics that influence smallholder farmer participation in high-value markets. An equation was used to predict the relationship between market access and the dependent variables that were hypothesized. A Probit model was used to predict the probability to assess if the smallholder farmer participated in tomato marketing or not.

3.5.1 Diagnostics tests

Outcome Equation

Access to high-value markets $(Y_i) = b_0 + b_1 Age + b_2 Edu + b_3 Hsize + b_4 Output + b_5 Price$

$+ b_6 Total\ In + b_7 Ownlivestock + b_8 Org + b_9 Road + b_{10} Distmk + b_{11} Ext + b_{12} Markinfo +$

$b_{13} TaxPay + b_{14} PayPeriod + b_{15} TransCosts + b_{16} ColdCha$

Definition and *a priori* assumptions

- Age = the age of the household head. The assumption is that age will have a positive effect

- Edu = education level of the household head. The assumption is that education will have a positive effect

- Size = the household size. The assumption is that household size will have a positive effect

- Output = the total production of horticultural produce. The assumption that output will have a positive effect

- Price = the price of horticultural produce. The assumption is that price will have a positive effect

- TotalIn = the total household income. The assumption is that Total income will have a negative effect.

- Ownlivestock = livestock ownership. The assumption is that livestock ownership will have a negative effect

- Org = membership of a farmer organization. The assumption is that members will have a positive effect

36

- Road = access to roads. The assumption is that assess to good roads will have a positive effect

- Distmk = distance to the market. The assumption is that shorter distances will have a positive effect

- Ext = access to extension service. The assumption is access to the extension will have a positive effect.

- Markinfo = the access to market information. The assumption is access to marketing information will have a positive effect

- TaxPay = tax payment expected. The assumption is a requirement of taxes will have a negative effect

- PayPeriod = time between delivery and payment. The assumption is that long delivery and payment periods will have a negative effect

- TransCosts = the total costs of accessing the market averaged per kilometer. The assumption is that high transactional costs will have a negative effect

- Coldcha = availability of cold chains in the farmers' area with 5km. The assumption is that absence of cold chains will have a negative effect.

Factors influencing market participation for horticulture smallholder tomato farmers by using the Heckman Two-Stage Probit Model.

Table 3. 2 Factors that influence market participation

Variables	Variable	Measurement of the Variables	Expected sign
Dependent Variables			
Prob ((Y_i)) Access to high-value markets (Y_i)	Type of household (market participant/Non-market participant)	Dummy (1 = market participant, 0 = Non-market participant)	

Independent Variables			
Age	Age of the household head	In Years (Continuous)	+/-
Sex	Sex of the household head	Male or female (not continuous)	+/-
Educ	Education level of the household head	Education Level (Continuous)	+/-
Hsize	Household size	Size of Household (Continuous)	+/-
Output	Total production of tomatoes	In Kilograms	+
Price	Price of tomatoes	In USD (Continuous)	+
TotalIn	Household income	In USD (Continuous)	+/-
Own Livestock	Ownership of livestock	Dummy (1 = Yes, 0 = No)	+/-

Variables	Variable	Measurement of the Variables	Expected sign
Org	Membership to farmer organization	Dummy (1 = Yes, 0 = No)	+/-
Road	Access to roads	Dummy (1 = Yes, 0 = No)	

Distmkt	Distance to the market	In Kilometer (Continuous)	-
Ext	Access to extension service	Dummy (1 = Yes, 0 = No)	+
Marketinfo	Access to market information	Dummy (1 = Yes, 0 = No)	+
TaxPay	Tax payment expected	Dummy (1 = Yes, 0 = No)	-
PayPeriod	Time between delivery and payment	In days	-
TransCosts	The total costs of accessing the market averaged per kilometer	In USD/kilometer	-
Coldcha	Is the availability of cold chains in the farmers' area within 5km	In kilometers	-

3.5.2 Methodological Limitations

The major limitation of the methodology used was that the propositions of horticultural harvest quantities produced by each farmer will vary. This inconsistency may cause distortions in some incidents. Quantitative methods may not highlight the challenges that also affect farmers in choosing horticulture over other forms of agriculture. While regression methods can be used to assess the relationships between various variables, variables of a social nature such as gender will need a qualitative approach to unearth some hidden factors in production which will not be entirely concluded using quantitative methods.

A sampling of farmers needed correct up-to-date secondary data from the relevant bodies. However, it should be noted that the correctness or accuracy of the data influenced the direction of the research in terms of the quality of the farmer to be interviewed. Farmers with trading records would have been ideal, however not reflected on the lists from ZFU and AGRITEX.

Quantitative methods did not bring to surface issues such as feelings, perceptions, attitudes, and other factors that qualitative methods are likely to bring out.

3.6. Data Collection Procedure

Questionnaire

Questionnaires were used in collecting data that is needed to be compared across the various members of the research sample. This allowed the researcher to process the data

to identify any patterns or trends in the data. To quicken the data collection process, data was collected using Koko Collect on mobile devices. The researcher targeted smallholder farmers for the collection of the required data.

Justification of Questionnaires

The use of questionnaires allowed the researcher to follow a consistent pattern in generating primary data. Some of the questionnaires can be administered via telephone making it cheaper for the researcher to gather data, and reduce the likeliness of physical contact because of Covid-19 prevention. Some of the targeted participants were conservative with their data and they would then be willing to give data if they saw the full list of questions, they would be expected to give responses to.

Research questionnaire pretesting

The researcher adopted data collection tools from previously validated and highly qualified data instruments from previous empirical research. This ensured consistency in the class of research and reduce standard errors in the measurement of results with others. The questionnaires were pretested to an audience with similar characteristics to those targeted for the research. This allowed the researcher to review the question and see if they met the required standards, as well, as to assess if they were suitable to collect the data to make the required analysis.

3.7. Analysis and Organization of Data

Each objective was evaluated differently, presenting the data relevant to that objective. The data were presented using descriptive statistics showing frequencies, mode, median, and mean of the various variables. Cross tabulations were used to analyze relationships

between given variables. The Probit results were compared using the strengths of the coefficients and the significance level, drawing the arguments and conclusions of the findings.

3.8. Ethical Consideration

The research questionnaire was designed in a manner that ensured that the information captured was private and confidential during the data collection, analysis, and presentation of findings. The researcher pledged data protection and ensured that consent was given by the participants to participate in the research.

The research was guided by principles from the revised quantitative Market Research Society's code of conduct as analysed by Mouncey (2010). Some of the guiding principles require that the respondents are anonymous. The data should not be traced back to any respondent. Additionally, the data should be used by the researcher and not for any other purposes other than the research.

Data and information in the research were subject to high confidentiality and protection. To ensure this, Kobo Collect, an electronic data collection method was used with log-in credentials required to access the database. The data were analyzed as a whole data set, therefore eliminating the likeliness of focusing results on individual respondents.

3.9. Summary

The chapter detailed the research design showing the processes that were undertaken to collect the data for analysis. The respondents were identified in the research sample and an explanation of the sampling methods was given to highlight how the research sample was selected from the population sample. Simple random sampling was the technique that was used. Various sources of data such as primary data and secondary data were identified as critical to the research, while appropriate research instruments were selected, highlighting the advantages and disadvantages.

Data collection procedures were clarified. These included pretesting the interview tools, working with a research team as well as creating the data collection schedule.

The chapter also included steps in how the data was validated and how to ensure that the data collected is reliable for analysis. The chapter was concluded by how the data will be collected by assessing the composition of the research team and how data will be processed and presented.

CHAPTER 4 DATA PRESENTATION, ANALYSIS, AND INTERPRETATION

4.1 Introduction

This chapter detailed the research findings of the research that was conducted. The researcher analyzed the data collected using SPSS, described, presented, analyzed, discussed, and interpreted to highlight what the data is displaying. The data was presented using tables, graphs, and charts. The results of the study assisted the researcher to get an in-depth understanding of the study. Due to the explanatory nature of the research, it further inspired other areas of further research for the future. The chapter endeavored to answer the research objectives that prompted the research in the determinants of smallholder tomato farmers' participation in high-value markets. case of horticulture marketing in Shurugwi to be carried out. The chapter also presents a summary of the findings.

4.1.1. Respondents

The database for the respondents was grouped per ward to ensure fair representation of participants from the wards. The third element from the lists was selected to be added to the sample. In some cases, respondents could not be mobilized to participate in the research for various reasons, such as contact numbers not available, deceased people o the database, relocated people, not being active in tomato production. The next name in the database below that respondent was used to replace.

The researcher collected data using Kobo collect and electronic mobile data collection system. The application was GPS enabled to show the location of the various responses. The map below, therefore, shows where the respondents were drawn from across the district.

'
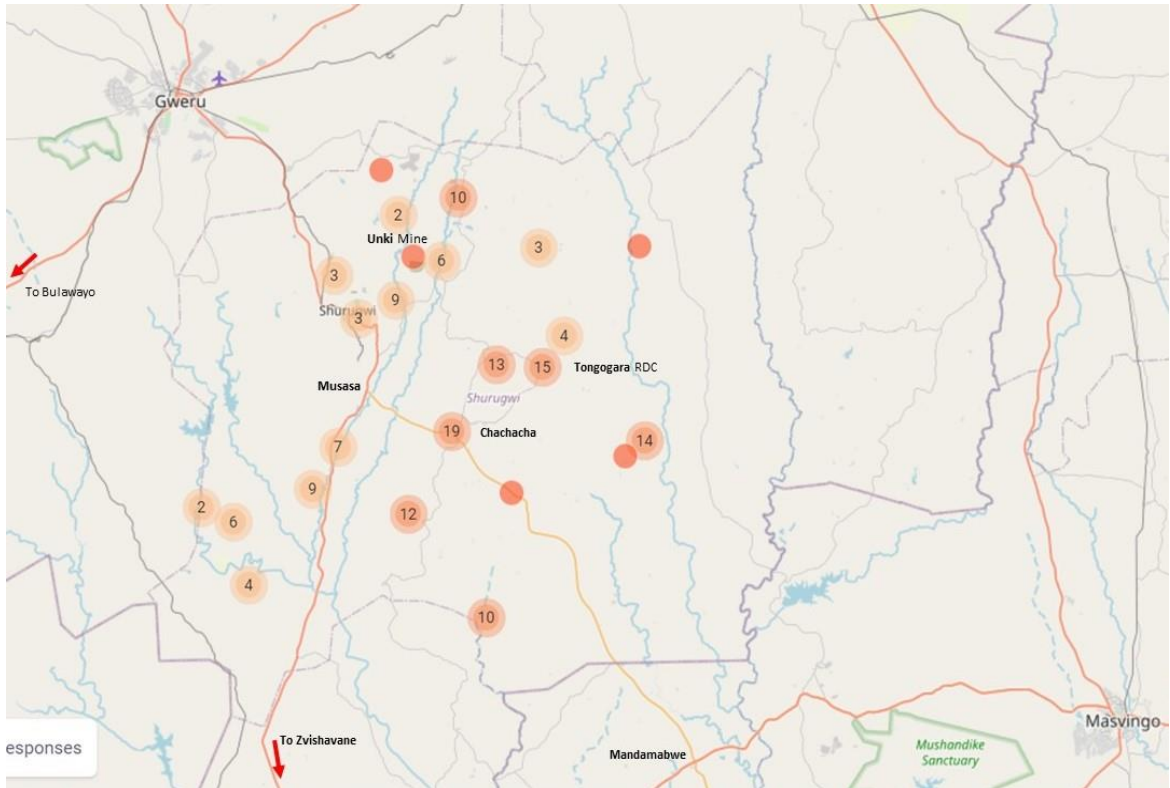
Figure 4. 1 Map of Shurugwi showing respondents locations

From the established sample size of 156 smallholder farmers. All 156 smallholder farmers approached agreed to participate in the survey. A response rate of 100 % was obtained from a sample size of 2 500, maintaining the integrity of a 99 % confidence interval with a 10 % margin of error.

Table 4. 1 Agreement to Participate

Agreement to Participate					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	156	100.0	100.0	100.0

4.2 Data Presentation and Analysis

4.2.1 Socio-economic characteristics

4.2.1.1 Gender

A total of 156 respondents/heads of households participated in the study. All the households that were contacted agreed to participate in the study after being briefed on the details of the research, ethical and privacy standards. The research assistants explained thoroughly the reason why the research was being done and the voluntary nature of the participants including their right to withdraw their participation in the study at any time. The data shows that 57 (36.5 %) of the respondents interviewed were women, while 99 (63.5 %) were male counterparts. This further draws a commonly held observation that men dominate agriculture, as well as that men, are the heads of households.
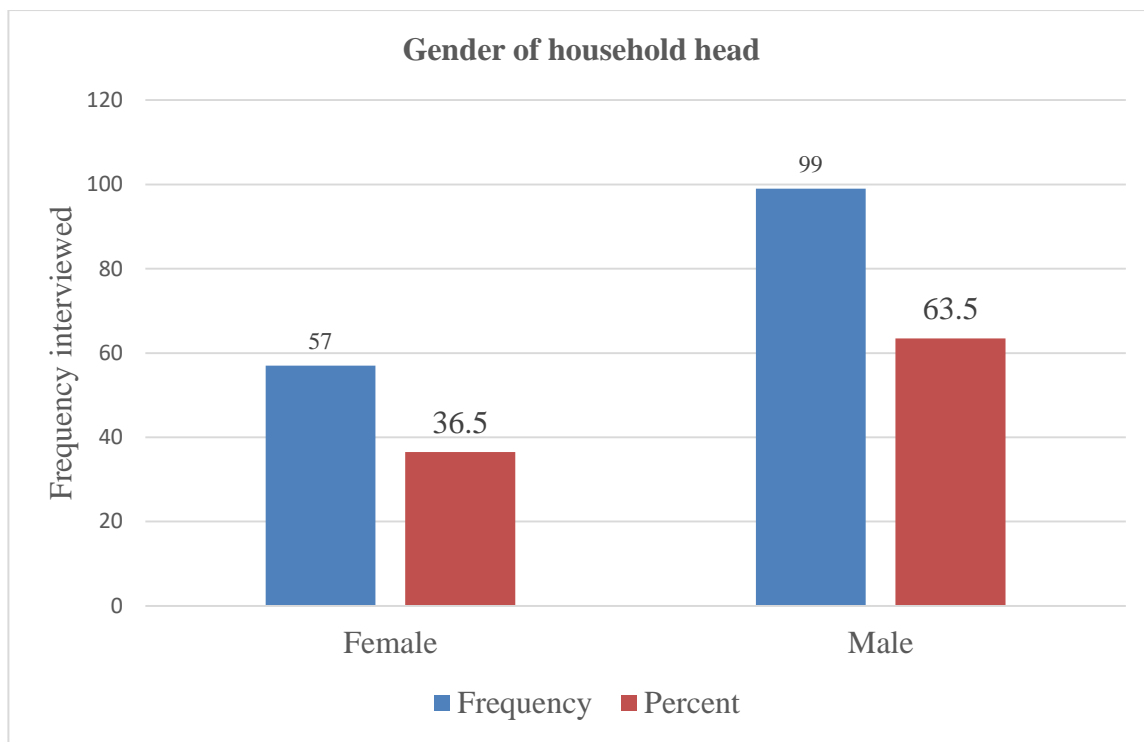
Figure 4. 2 Gender of household head

4.2.1.2 Age of household head

The data shows that 11.5% of the respondents were people below the age of 35. This cut-off is a standard definition of young people in economic activities. This data, therefore, demonstrates fewer young people in tomato production, insinuating a dislike for agriculture from the youth as they pursue artisanal mining.

A total of 102 (65.4 %) respondents were people between 36-60 years. This shows that a cumulative total of 76.9 % of the productive population were reached, leaving 36 (23.1 %) of the population being respondents above the age of 60.
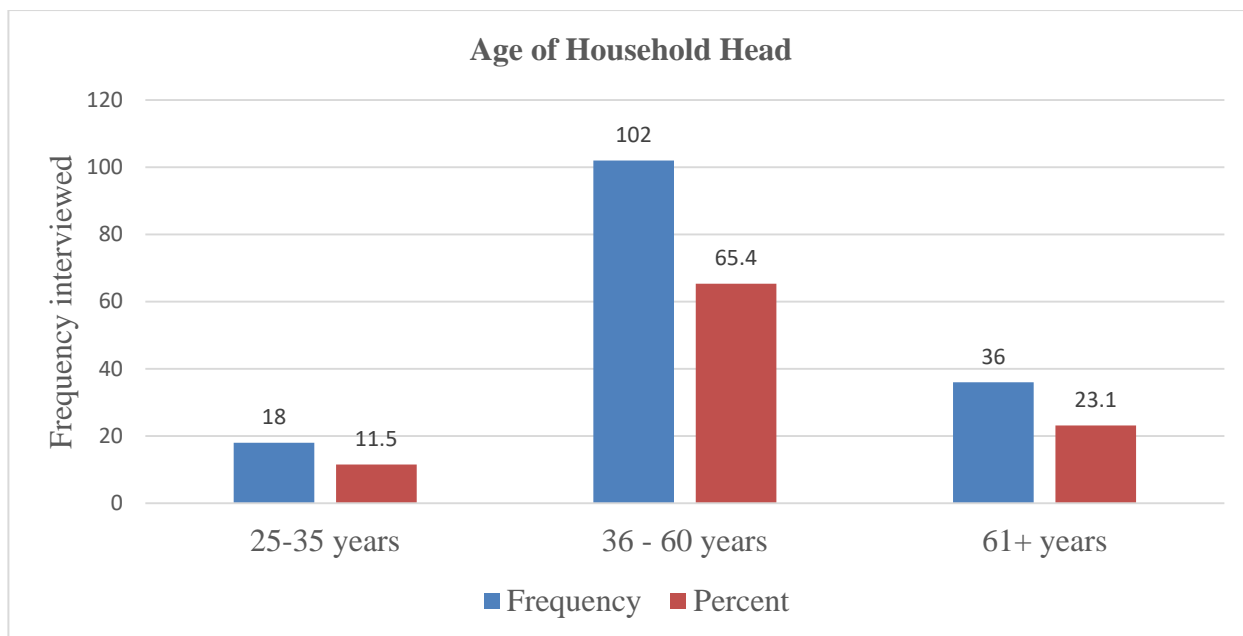
Figure 4. 3 Age of household head

4.2.1.3 Occupation

Of the 156 smallholder farmers interviewed, three (1.9 %) were found to be having small business enterprises that they operate. Four respondents (2.6 %) were formally employed full-time while the majority 148 (94.6 %) were full-time smallholder farmers without any other occupation, showing that they were fully reliant on farming. However, a significant number of farmers reported that they are involved with occasional artisanal mining to supplement their income although the data was irregular and too scattered for analysis. Other respondents were not comfortable disclosing their participation in artisanal mining.
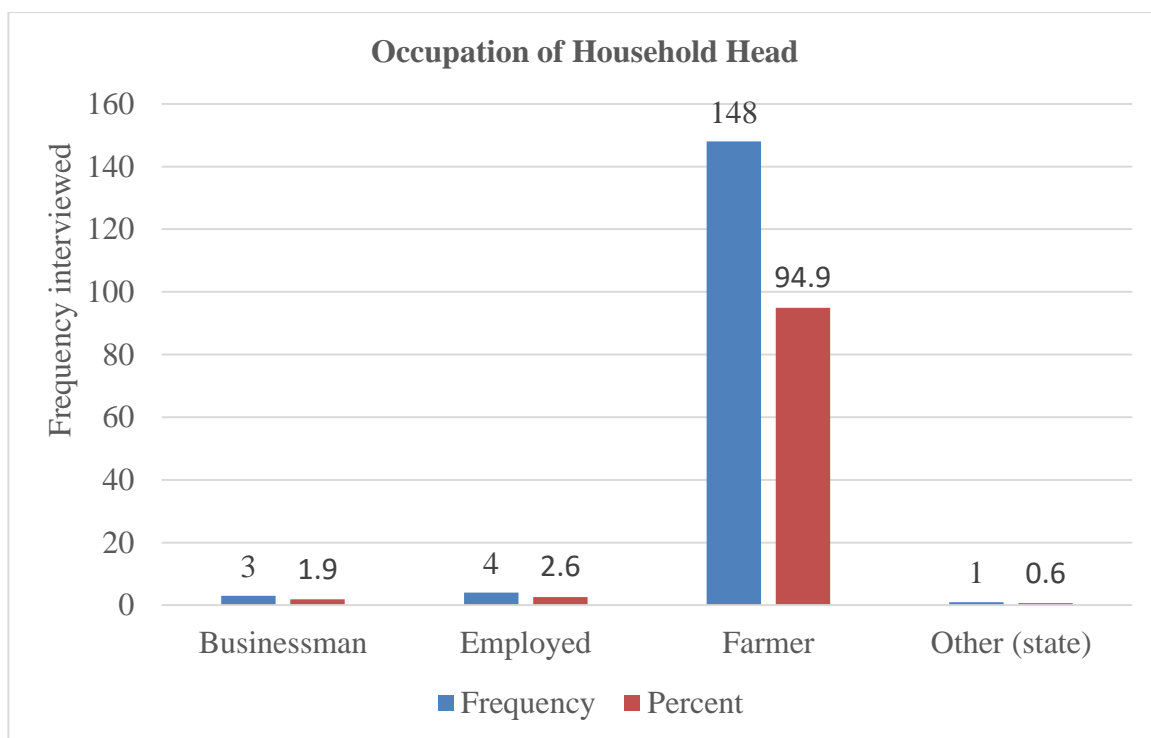
Figure 4. 4 Occupation of household head

4.2.1.4 Marital Status

The data shows that 125 (80.1 %) of the respondents reported that they were in various types of marriages accepted culturally, while four (2.6) were divorced, two (1.3 %) were never married and 25 (16 %) were widows or widowers. ZIMVAC (2020) data shows that on average 70 % are married and 20 % are widowed.

Marital Status of Household Head
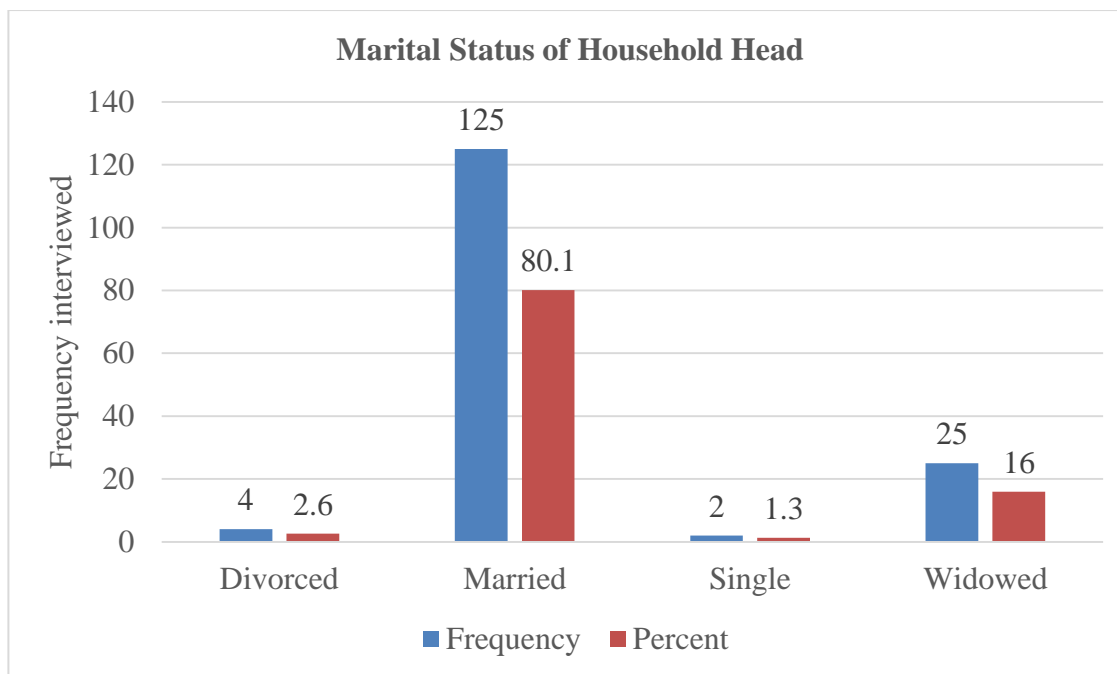
Figure 4. 5 Marital Status of Household Head

4.2.1.5 Household size

The mean size of the household was 6.08 people per household with a median of 5.50 and a mode of 5 people. It was noted that the largest household interviewed had 14 people, while the smallest one was 1 person.

Table 4. 2 Household size

Household size		
N	Valid	156
	Missing	0
Mean		6.08
Std. Error of Mean		0.197
Median		5.50
Mode		5
Std. Deviation		2.464
Variance		6.071
Range		13
Minimum		1
Maximum		14

4.2.1.6 Highest educational level for the household head

Observations in the data show that 117 (75 %) of the respondents reported that they went up to secondary school in their education. A total of 33 (21.2 %) reached primary school. One respondent reported that they had no formal education while five (3.2 %) reported that they went up to tertiary education.
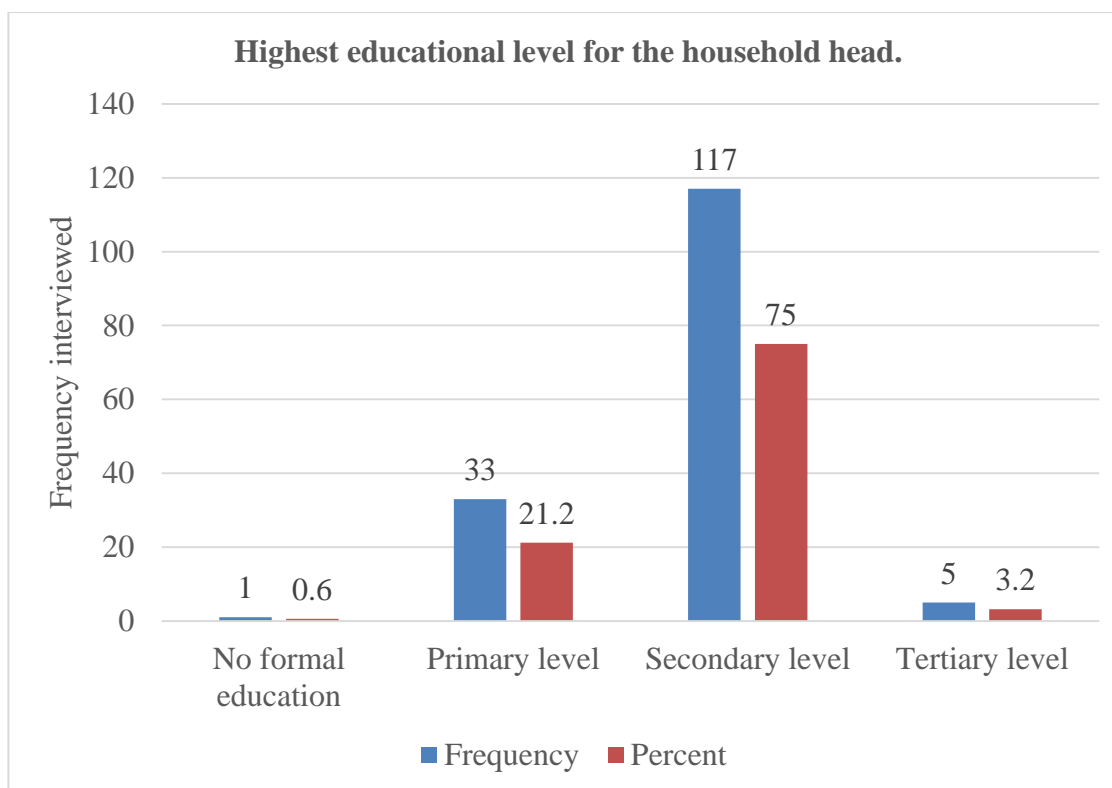
Figure 4. 6 Highest educational level for the household head.

4.2.1.7 Number of employees who assist with farm work

The table below shows the various alternatives of labor provision for the interviewed smallholder farmers. The labor categories were split into full-time, part-time, and family-provided labor.

Interviewed households showed that they rely mostly on family labor with a mean of 3.93 and mode of 3. The household that showed the highest number of family members had 10 family members providing labor

The household with part-time employees showed a mean of 1.51 as observed and a median of 1. The household with the maximum number of full-time employees was observed to be 9.

Table 4. 3 Number of employees

Number of employees				
		Full-time employees	Part-time employees	Family members
N	Valid	156	156	156
	Missing	0	0	0
Mean		1.75	1.51	3.92
Std. Error of Mean		0.170	0.158	0.154
Median		1.00	1.00	4.00
Mode		0	0	3
Std. Deviation		2.121	1.979	1.924
Variance		4.498	3.916	3.703
Range		9	10	10
Minimum		0	0	0
Maximum		9	10	10

4.2.1.8 Membership to farmer organization

A total of 104 (66.7 %) of the interviewed smallholder farmers reported that they belonged to farmer groups/organizations at the grassroots level affiliated to Shurugwi district farmers' unions. However, it was noted from the GPS coordinates, most of the memberships were concentrated on bigger centers in the Shurugwi district and irrigation schemes. Meanwhile, 52 (33.3 %) of the respondents show that they were not members of any farmer organizations and were hard to reach placed further from the main centers.
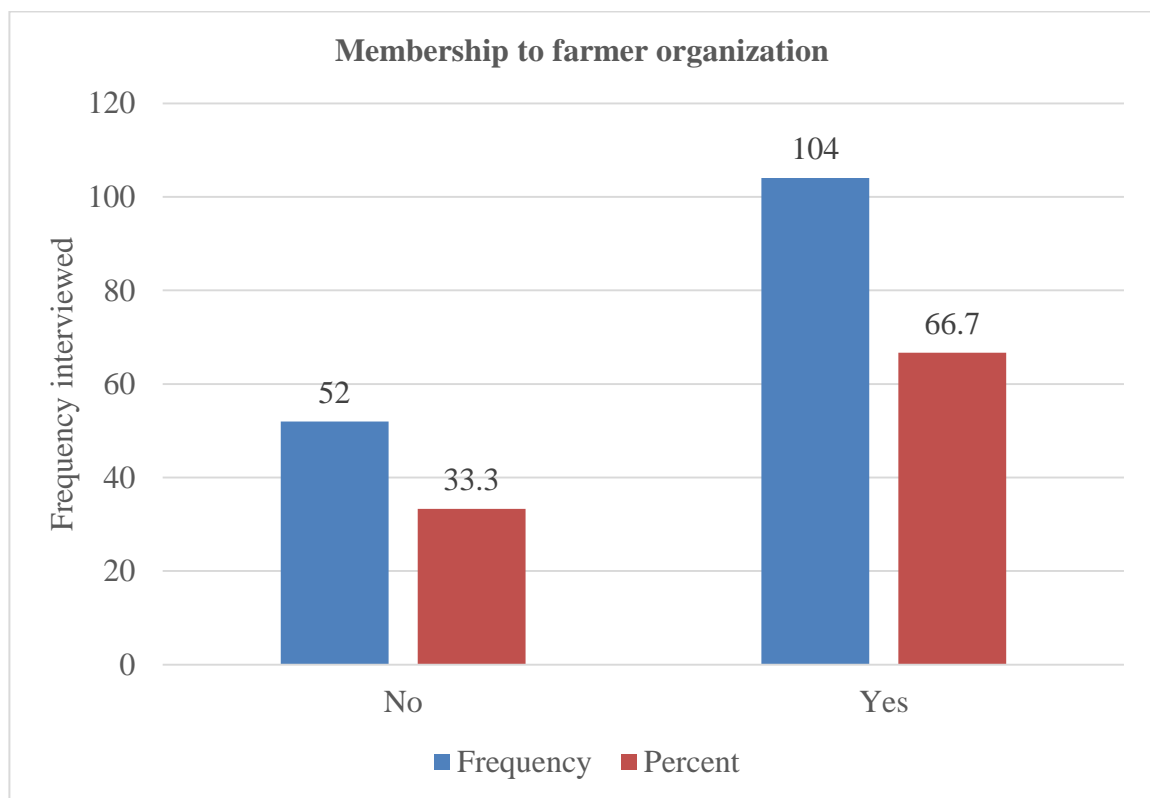
Figure 4. 7 Membership to Farmer Organisations

4.2.1.9 Net monthly income

It was observed however that a smallholder farmer earns a monthly mean income of USD 71.38, with a median of USD 50. The respondent with the highest net monthly income was reported to earn USD 500. The standard deviation for the net monthly income was noted to be 87.090 with a variance of 7584.68. However, the model for the net monthly income was zero showing that farmers rely on the seasonality of their crops for income.

Table 4. 4 Total aggregate monthly income

Total aggregate monthly income		
N	Valid	156
	Missing	0
Mean		71.38
Std. Error of Mean		6.973
Median		50.00
Mode		0
Std. Deviation		87.090
Variance		7584.677
Range		500
Minimum		0
Maximum		500

4.2.1.10 Land Tenure

Table 4.8 showed that out of the 156 respondents, 12 (7.7 %) reported that they purchased the land where they are carrying out their agricultural operations, 110 (70.5%) reported that they are using family land that has been passed on from generation to generation. This is reflective of the Shurugwi district's demarcated areas for communal land. One respondent (0.6 %) reported that they are using rented land while 33 (21.2 %) reported that they acquired the land through the government reform program. This was also cross-tabulated with the GPS map showing the respondents coming from the areas which were demarcated for resettlement.
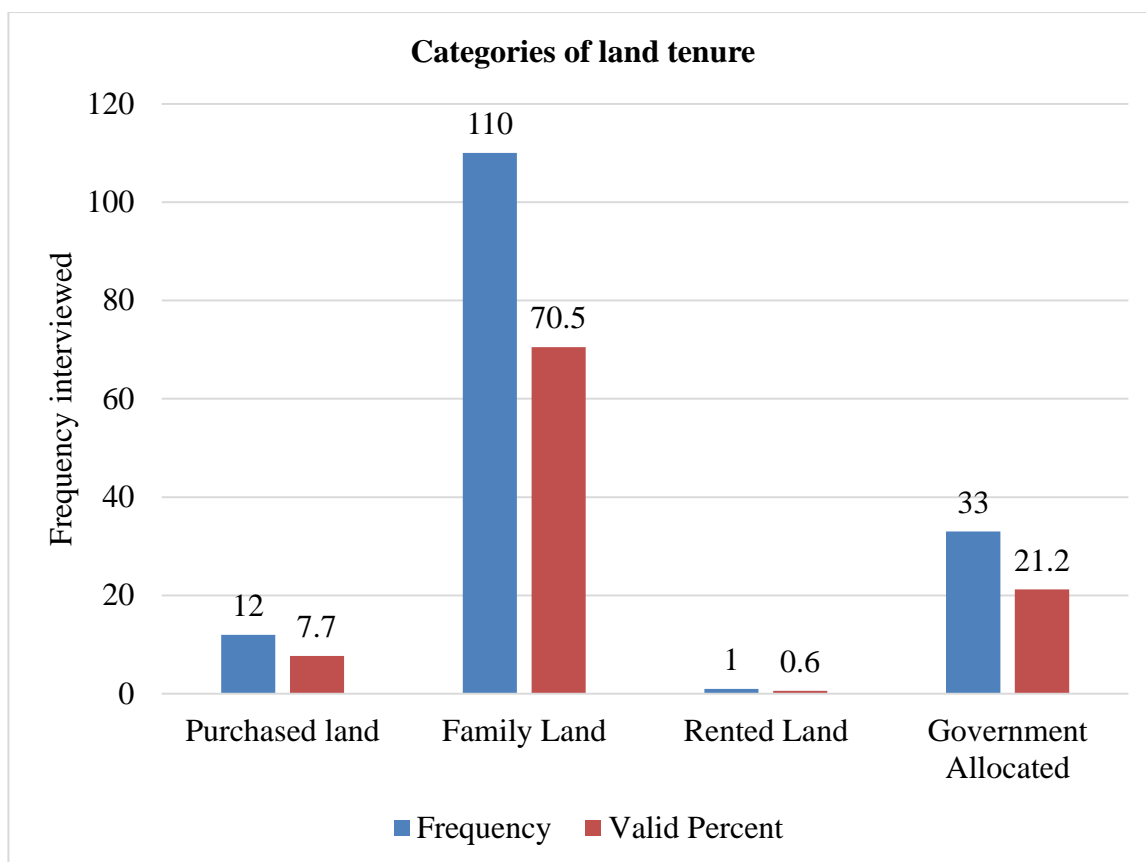
Figure 4. 8 Land tenure

4.2.1.11 Size of land

Of the interviewed 156 people, 125 (80.1 %) reported that they use between 0 to 5

hectares of land for their agricultural activities. This is consistent with the ZIMVAC

2020 report on land ownership that 80 % of the population won land between 0-5

hectares. A total of 24 (15.4 %) use land between 6-10 hectares, while 7 (4.5 %) use land above 10 hectares. It was also noted that these 7 are located in the new resettlements.
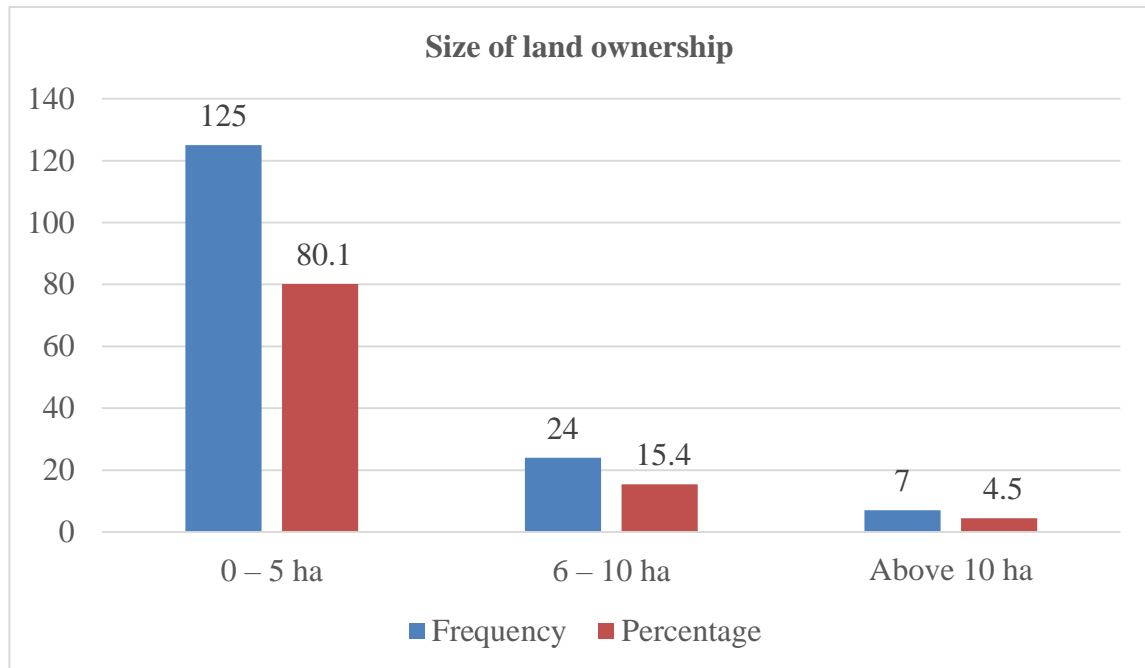
Figure 4. 9 Size of land

4.2.1.12 Types of crops grown

The figure below shows the respondents who grow a variety of crops. A total of 47 (30.1 %) reported that they grow fodder crops such as velvet beans, lucerne. This is showing uptake as a result of an NGO-led program to grow fodder crops. Farmers who grow maize were observed to be 155 (99.4 %) showed, while 128 (82.1 %) grow a variety of legumes, 79 (50.6 %) grow small grains such as sorghum and finger millet, 125 (80.1 %) grow horticultural crops, 12 (7.7 %) grow wheat whole 31 (19.9 %) grow sunflowers.
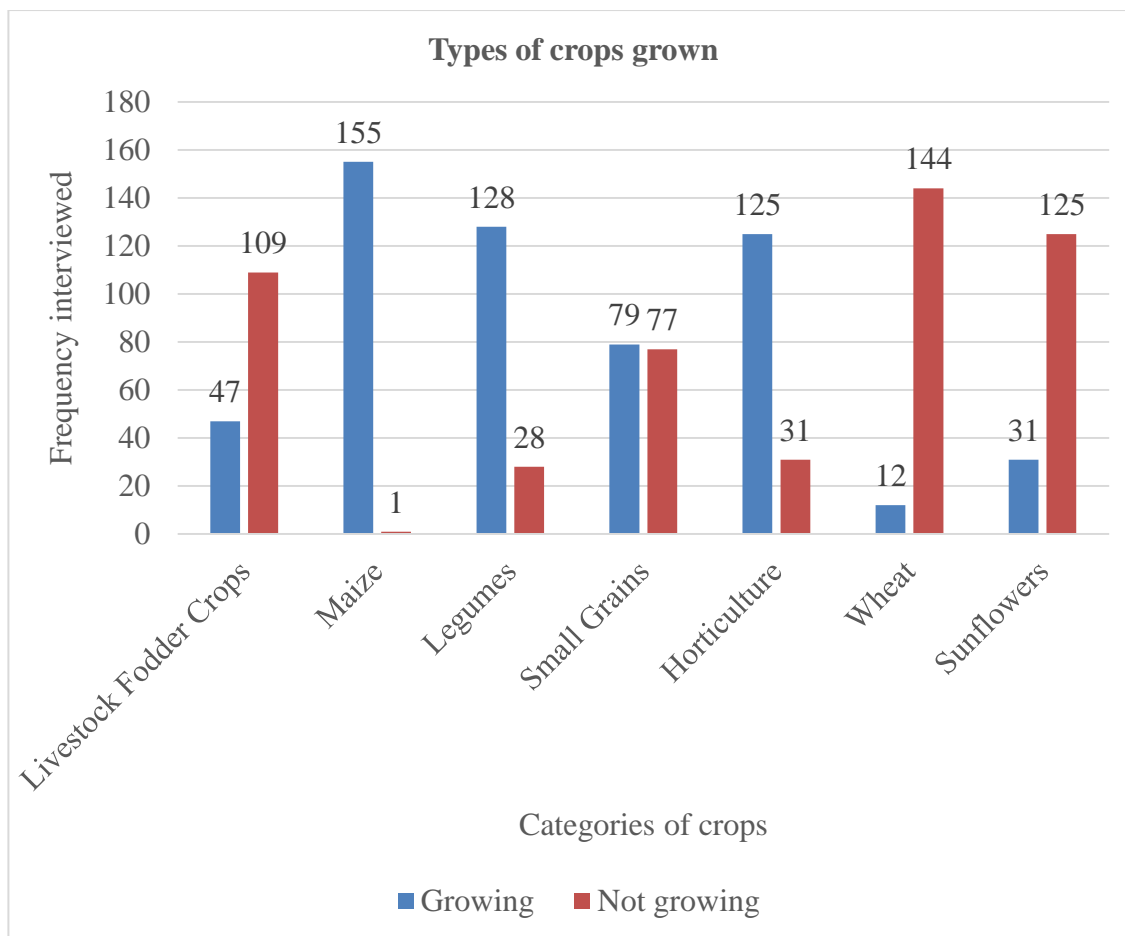
Figure 4. 10 Types of crops grown

4.2.1.12 Number of livestock kept

The table shows of the 156 respondents interviewed, the mean number of cattle owned by the farmers is 7, with a mean of 9 cattle. Consequently, 26 farmers showed that they did not own any cattle, showing a mode of zero. A noted number of one farmer-owned the highest number of cattle 60.

Table 4. 5 Number of Livestock kept

Statistics		
Q3 Number Of Livestock Kept		
N	Valid	156
	Missing	0
Mean		9.10
Median		7.00
Mode		0
Std. Deviation		9.250
Variance		85.558
Sum		1419

4.2 Discussion and Interpretation

The first stage of analysis was to assess the various demographic and socioeconomic characteristics and to assess their implication on access to markets. The second stage was to conduct cross-tabulation comparisons between variables that were related and to assess the degree of relationship. The third process for analysis was to conduct the Heckman 2 step Probit analysis to validate the findings from the statistical analysis. The analysis was carried out with an expected error of 5 %.

4.3.1 Result 1: To analyze the socioeconomic characteristics of the individual smallholder tomato farmers that influence access to markets in Shurugwi.

Cross tabulation

The data showed that being a member of farmer organizations has a positive effect on access to information. The interviewed farmers showed that 60.2% (94/156) had enhanced chances of getting information.

Table 4. 6 Farmer Organization – Access To Information Cross tabulation

Q8BelongToFarmerOrganization * QE1AccessToInformation Cross tabulation				
Count				
		QE1AcessToInformation		Total
		Yes	No	
Q8BelongToFarmerOrganizat ion	Yes	94	10	104
	No	25	27	52
Total		119	37	156

The table below shows that level of education has an effect on joining farmer organizations A combined total of 104/156 farmers interviewed showed that they were in a farmers group. 94/156 members of farmers who belonged to groups also reported that they had access to information.

Table 4. 7 Education Level - Farmer Organization Cross tabulation

Q6EducationLevelForHH * Q8BelongToFarmerOrganization Cross tabulation				
Count				
		Q8BelongToFarmerOrgani zation		Total
		Yes	No	
Q6EducationLevelFo rHH	No formal education	0	1	1
	Primary level	22	11	33
	Secondary level	80	37	117
	Tertiary level	2	3	5
Total		104	52	156

The level of education was realized to affect access to information. Of the interviewed farmers, 119/156 farmers showed that education affects their ability to access information. This is shown in Table 4.8

Table 4. 8 Education Level - Access To Information Cross tabulation

Q6EducationLevelForHH * QE1AccessToInformation Cross tabulation				
Count				
		QE1AcessToInformation		Total
		Yes	No	
Q6EducationLevelFo rHH	No formal education	1	0	1
	Primary level	26	7	33
	Secondary level	88	29	117
	Tertiary level	4	1	5
Total		119	37	156

4.3.2 Probit analysis for determinants of market participation

Model Information

Binomial Probit regression was carried out for the 156 (100%) farmers to analyses their access to market factors. The dependent variable was set "Sell to Major" markets were compared with the independent variables using this outcome equation:

Access to high-value markets (Yi) = $b_0 + b_1$Age + b_2Edu + b_3Hsize + b_4Output + b_5Price + b_6Total In + b_7Ownlivestock + b_8Org + b_9Road + b_{10}Distmk + b_{11}Ext + b_{12}Markinfo + b_{13}TaxPay + b_{14}PayPeriod + b_{15}TransCosts+ b_{16}ColdCha

Table 4. 9 Model Information

Model Information	
Dependent Variable	Q3SellToMajor[a]
Probability Distribution	Binomial
Link Function	Probit
a. The procedure models No as the response, treating Yes as the reference category.	

Table 4. 10 Case Processing Summary

Case Processing Summary		
	N	Percent
Included	156	100.0%
Excluded	0	0.0%
Total	156	100.0%

Table 4. 11 Categorical Variable Information

Categorical Variable Information				
			N	Percent
Dependent Variable	Q3SellToMajor	Yes	60	38.5%
		No	96	61.5%
		Total	156	100.0%

Omnibus test results

The omnibus test was carried out to assess the overall hypothesis on the quadratics to include OLS, variance, and covariance as well as rational quadratic statistics including ANOVA and F tests in analysis of variance, analysis of covariance, linear regression, chi-square, and logistics regression. The test result (P>0.000) shows that the factors in the model are significant in measuring the outcome of the equation, and have strong explanatory power in factors that determine access to markets. This shows the strength of socio-economic factors in influencing the farmers' decision in accessing high-value markets.

Table 4. 12 Omnibus Test

Omnibus Test^a		
Likelihood Ratio Chi-Square	df	Sig.
65.534	15	.000
Dependent Variable: Q3SellToMajor Model: (Intercept), AgeOFHH, Q5HouseholdSize, Q6EducationLevelForHH, Q3QuantityOfTomatotes, Q3ProcessedPricePerKilo, Q10FulltimeWorkIncome, Q3NumberOfLivestockKept, Q8BelongToFarmerOrganization, Q10BadRoads, DistanceToMarket, QE2ReceiveMarketInformation, Q3ExtensionOficers, TaxFees, TransportCost, QD7AccessToColdRooms		
a. Compares the fitted model against the intercept-only model.		

Parameter Estimates

Table 4.22 shows the results of the Probit test using a 95% confidence interval giving a 0.05% margin of error. Household Size showed chi-square test results below 0.05, indicating that these factors were critical in determining access to markets for farmers in Shurugwi. The results of the Probit are described by the coefficients and the significance level.

Table 4. 13 Socio-Economic Parameter Estimates

Parameter Estimates							
			95% Wald Confidence Interval		Hypothesis Test		
Parameter	B	Std. Error	Lower	Upper	Wald Chi-Square	df	Sig.
(Intercept)	4.778	2.4798	-1.610	11.165	3.712	1	.054
AgeOFHH	.001	.0120	-.030	.032	.010	1	.921
Q5HouseholdSize	-.131	.0518	-.264	.002	6.407	1	.011
Q6EducationLevelForHH	-.100	.3063	-.889	.689	.107	1	.743
Q10OtherworkIncome	-.001	.0031	-.009	.007	.113	1	.737
Q3NumberOfLivestockKept	.008	.0151	-.031	.047	.307	1	.580
Dependent Variable: Q3SellToMajor							
Model: (Intercept), AgeOFHH, Q5HouseholdSize, Q6EducationLevelForHH, Q3QuantityOfTomatotes, Q3ProcessedPricePerKilo, Q10OtherworkIncome, Q3NumberOfLivestockKept, Q8BelongToFarmerOrganization, Q10BadRoads, DistanceToMarket, QE2ReceiveMarketInformation, Q3ExtensionServices, TaxFees, TransportCost, QD7AccessToColdRooms							
a. Fixed at the displayed value.							

Age of household head

The age of the household head was found to have a positive coefficient (0.001). This was consistent with the expected positive coefficient in the *A priori assumptions*. However, the results show that age is not significant (P>0. 05). This reflects that age is not a critical determinant for access to market in the study. This might be because of the age (mean 50.02, median 49). This shows that the farmers were experienced in agriculture with sufficient experience to base their opinions on. Other studies such as Abate et al. (2019) also found that age was not significant in evaluating access to markets, though with a negative coefficient, while Chamboko *et al.,* (2017) realized that age had a positive relationship to market access though was not significant.

Household size

The size of the household had a negative coefficient (-.131). This shows that an increase in household size reduces the likelihood of participating in high-value markets this factor was highly significant (p<0.05) showing that household size has a key factor in access to markets. This factor was also realized by Chamboko *et al.* (2017) who observed that the size of a household is an important factor in the decision to access high-value markets. Akrong *et al.,* (2021) also made a similar observation adding that the advantage that bigger households had, was the labor supply to boost output.

Education level for the household head

Education for heard of the household had a negative coefficient (-.100), showing that the more educated the head of household, the less likely they were in accessing high-value markets. This factor is highly insignificant (p>.0.05). Education of head of the household therefore negatively influences market participation. This is consistent with findings by Assefa and Deresse (2021) showing that level of education has no positive effect on access to markets. The study contradicts that of Akrong *et al.,* (2021)who concluded that education plays a role in market accessing markets, attributing literacy and numeracy skills as factors in accessing markets. In addition, Rikitu *et al.,* (2019) found education of the household as a key factor in accessing markets suggesting that increased awareness and formal education assists in decision making.

Other work income

The coefficient of other work income is negative (-.001) showing that if a farmer has other work income, this contributes negatively to their participation in the high-value market. However, this factor is not significant (p>0.05) showing that this was not a critical factor in the outcome equation. This was also observed by Chamboko *et al.* (2017) who found that other sources of income were impacting negatively on access to markets for milk producers. Omiti *et al.,* (2009) made a similar observation adding that farmers with other sources of income would make halfhearted attempts in agriculture. This indicator shows that there is a reduction in interest in agriculture in Shurugwi as more people are getting involved with artisanal mining, which has a better source of income.

Number of livestock kept

This was introduced into the equation as a dummy variable. The number of livestock had a positive coefficient (.008) but this factor is not significant ($p>0.05$). This shows that there is a positive relationship between livestock ownership and high-value market participation. Sehar (2018) identified that ownership of cattle was a significant measure of wealth and therefore the more the cattle, the more stability in a household. However, this finding contradicted, Kyaw *et al.,* (2018) who noted that a negative relationship existed between livestock ownership and rice production.

4.3.3 Result 2: To study the business logistics factors affecting access to tomato marketing in high-value markets.

A variety of factors was measured to measure their extent to the implication in access to markets. It was noted that 148 (94.9%) of the farmers were into tomato production mainly for marketing purposes. This is consistent with national statistics that 90% of horticultural farmers produce tomatoes.

Farmer reasons for tomato growing

5%

95%

■ Reason for Tomato Growing Consumption

■ Reason for Tomato Growing Marketing
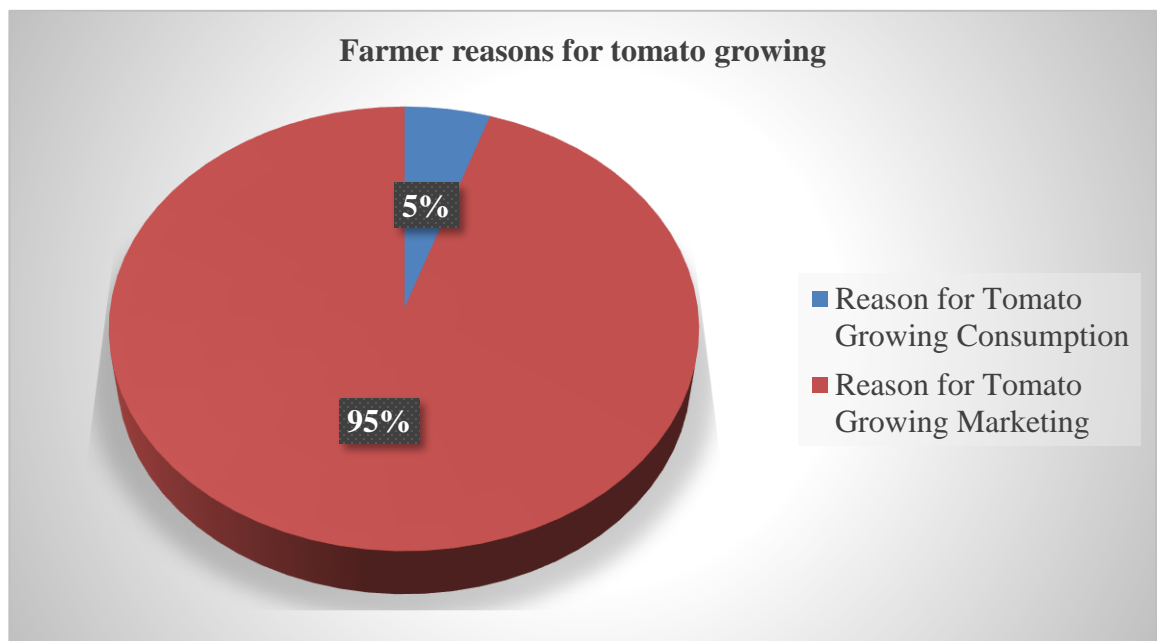
Figure 4. 11 Farmer reasons for tomato growing

An observed number of 152 (97.4 %) of the farmers reported that they grade their crops before transporting them to the markets the grading comprised of quality control, appearance texture, and size.
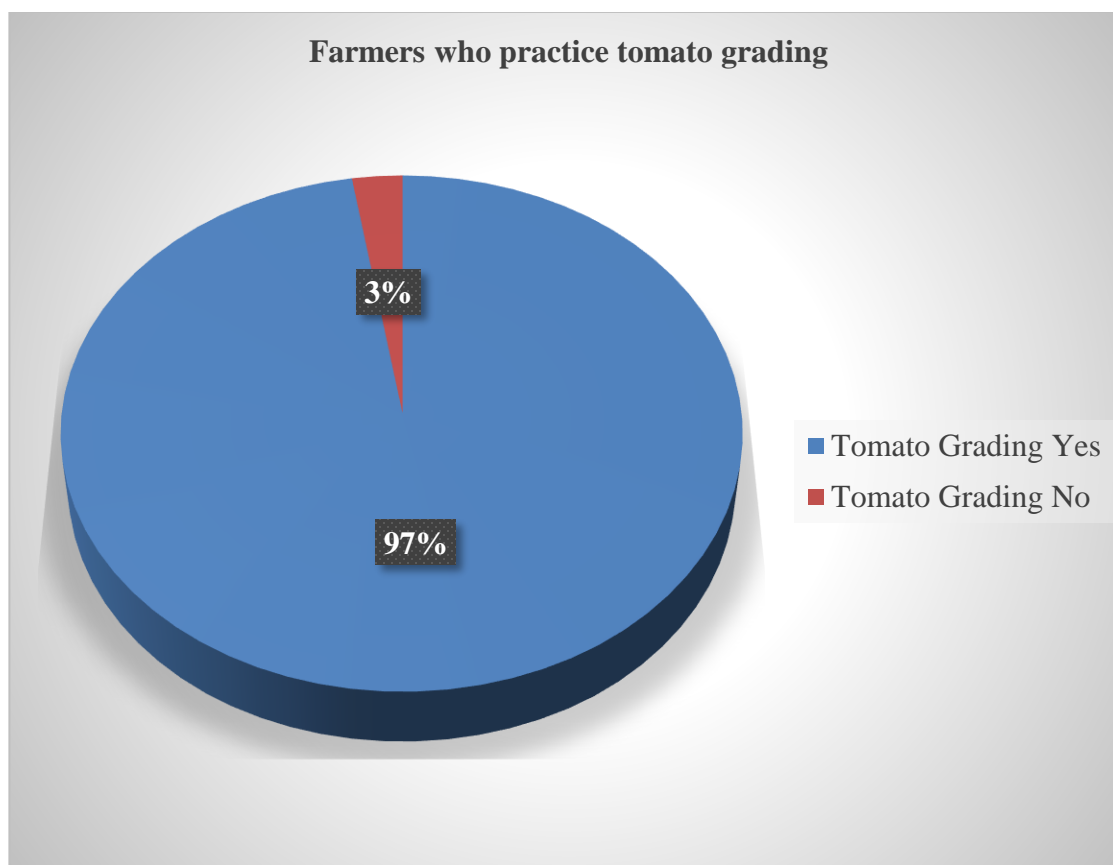
Figure 4. 12 Farmers who practice tomato grading

Also noted is 77 (49.4 %) farmers showed that they had access to cold chains while 79 (50.6 %) did not have. Upon running Chi-square testing, the issue of cold chains was not seen as a significant factor in access to markets.
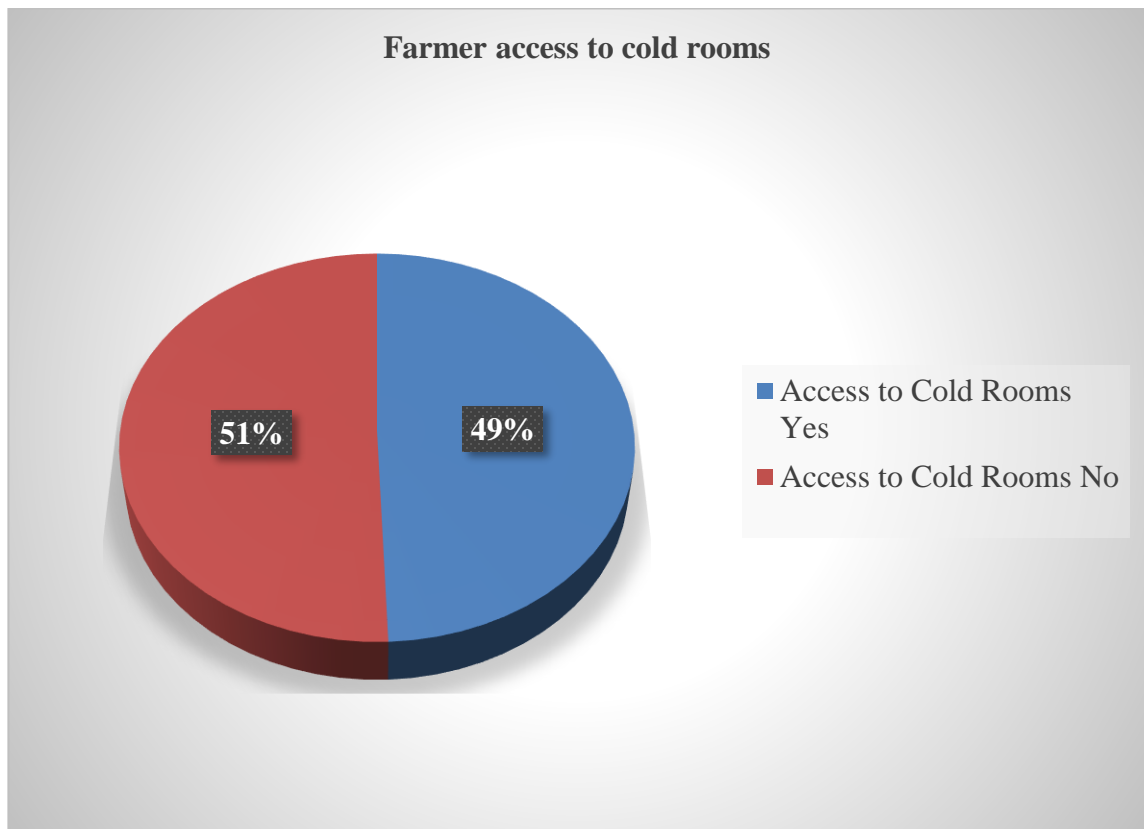
Figure 4. 13 Farmer access to cold rooms

Comparatively, 80 (51.3 %) of the farmers have access to a ready local market. However, it was also noted that this market was not enough to absorb the deliveries at the local market with some of the produce being lost to spoiling whole other being transported to the bigger markets.
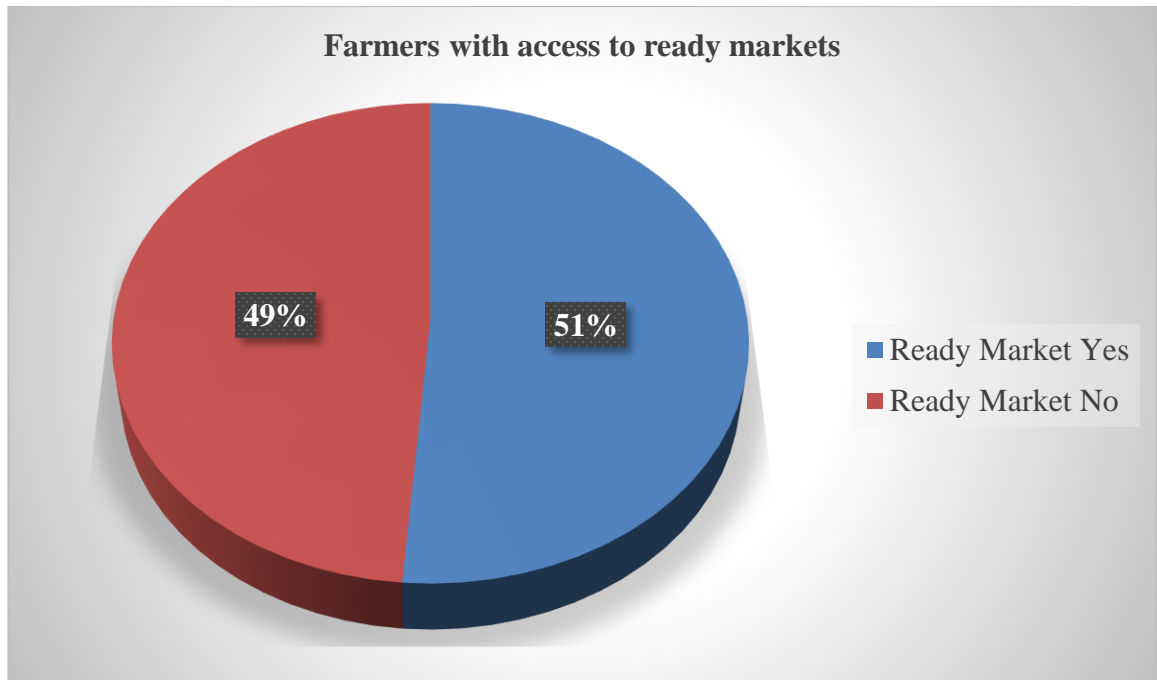
Figure 4. 14 Farmers with access to ready markets

Ownership to transportation was realized to be low among the sample with only 44 (28.2 %) reported that they own means of transportation to markets while 112 (71.8 %) did not. This is an issue with the cross-tabulations below, between transport ownership and access to major town markets. Farmers with their transport access major town markets more than those who did not have.
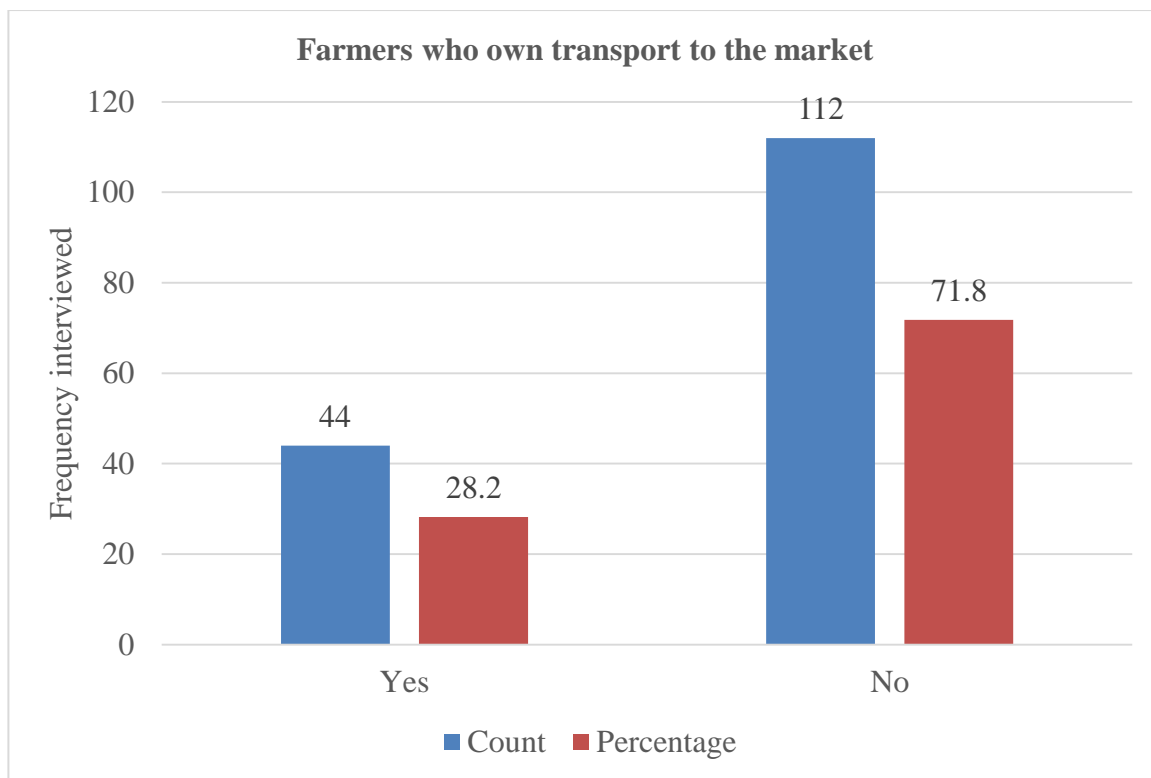
Figure 4. 15 Farmers who own transport to the market

On exploring local council levies data, 65 (41.7 %) farmers reported that they encounter local council levies or taxes at the local markets while 91 (58.3) reported that they do not. Upon further investigation, it was noted that all local town and major town markets have standard local levies and that farmers were evading payment of the taxes.
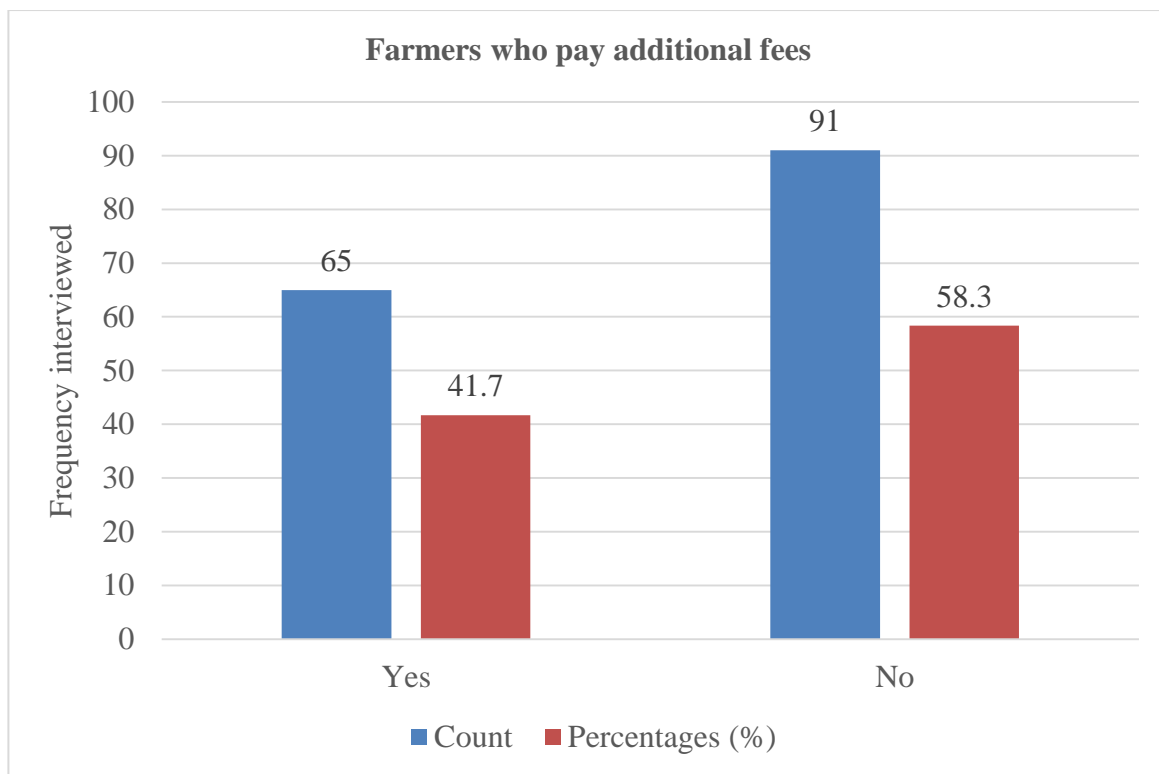
Figure 4. 16 Farmers who pay additional fees

An analysis of distance from markets showed that 106 (67.9%) farmers were within 20km of their market. Upon further investigation, these were the local markets and the major town markets were ranging between 30 to over 60 km from the farmers. The results show that 16.7 % of the farmers travelled between 31-40 km, 10.3 % of the farmers travelled a distance between 41-60 km and 5.1 km travelled a distance over 60 km. This results in further reflected upon comparisons of the cost to the major town markets.
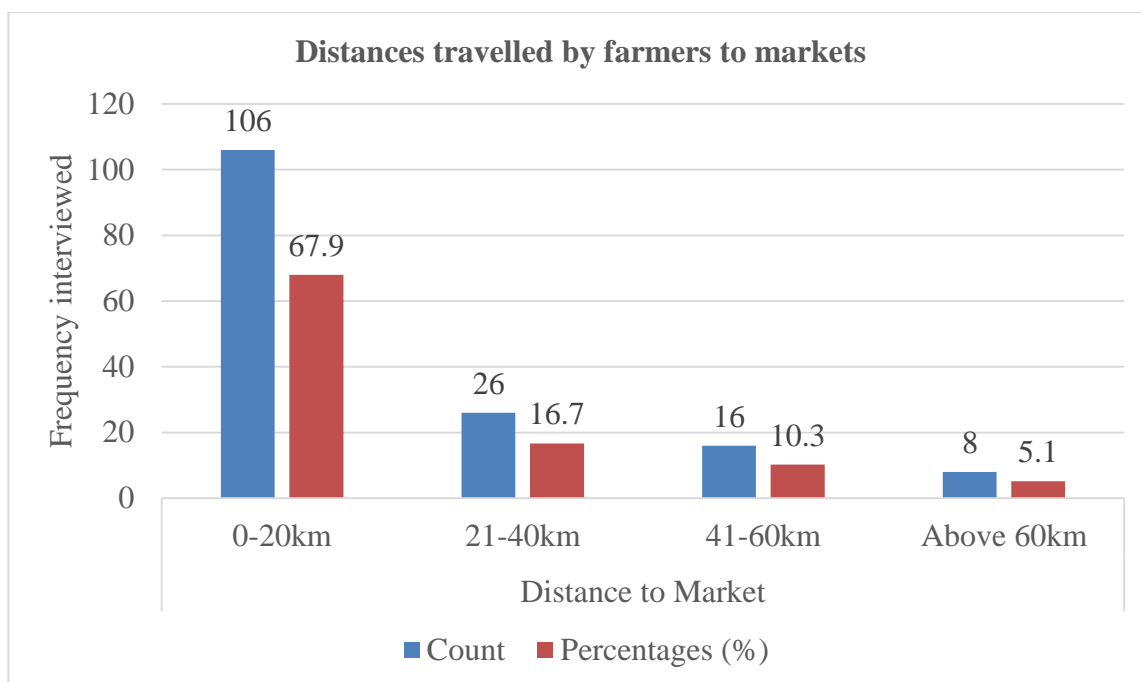
Figure 4. 17 Distances travelled by farmers to markets

Farmers who reported that they face transportation challenges to the markets were observed at 74 (47.4 %), hence proofing the reasons why 106 farmers tend to stick to the local village markets. However, 82 (52.6 %) did not reflect lack of transport as an issue. This was triangulated with farmers who were living along the major highways, indicating that in fact, the transport was not an issue as they access their local markets.
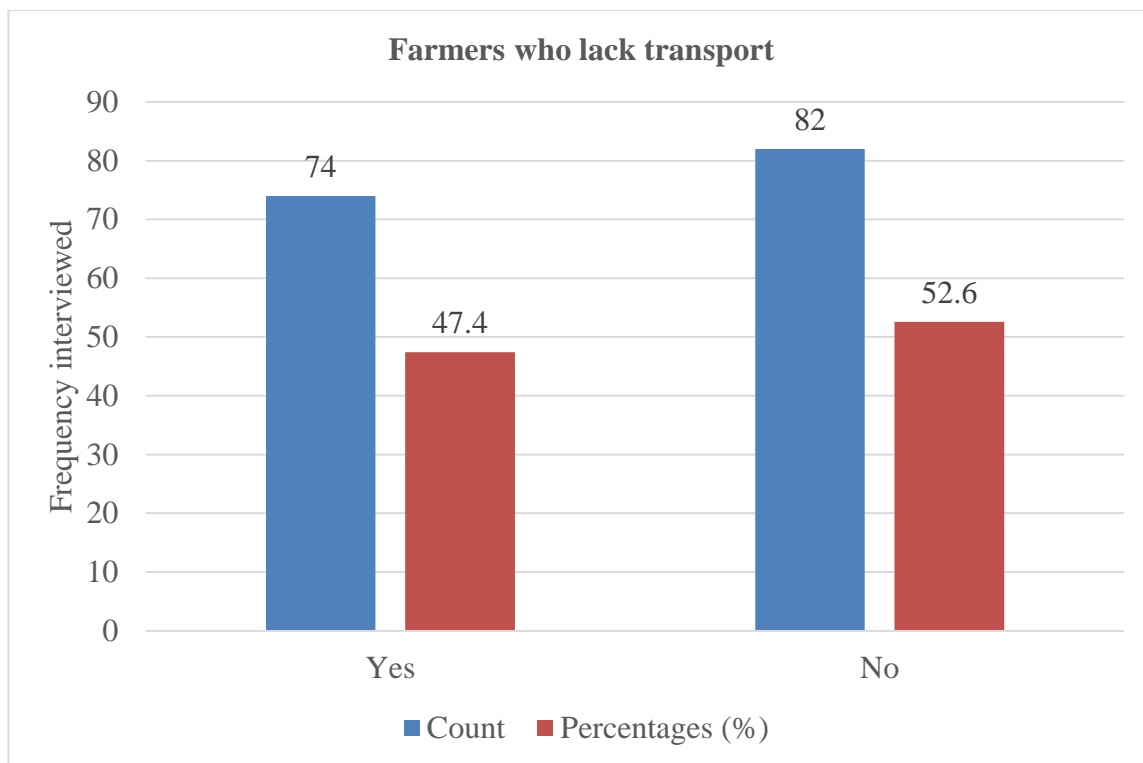
Figure 4. 18 Farmers who lack transport

However, 99 (63.5 %) reported that they were affected by the implications of the Covid-19 lockdown and the unpredictability and uncertainty of rules around Covid-19. Other 57 (36.5 %) farmers alluded to the fact their proximity to their local markets did not affect them as they were within the accepted guidelines of the movement restrictions. In addition, the exemption of agriculture as an essential service gave some degree of freedom for farmers to access markets.
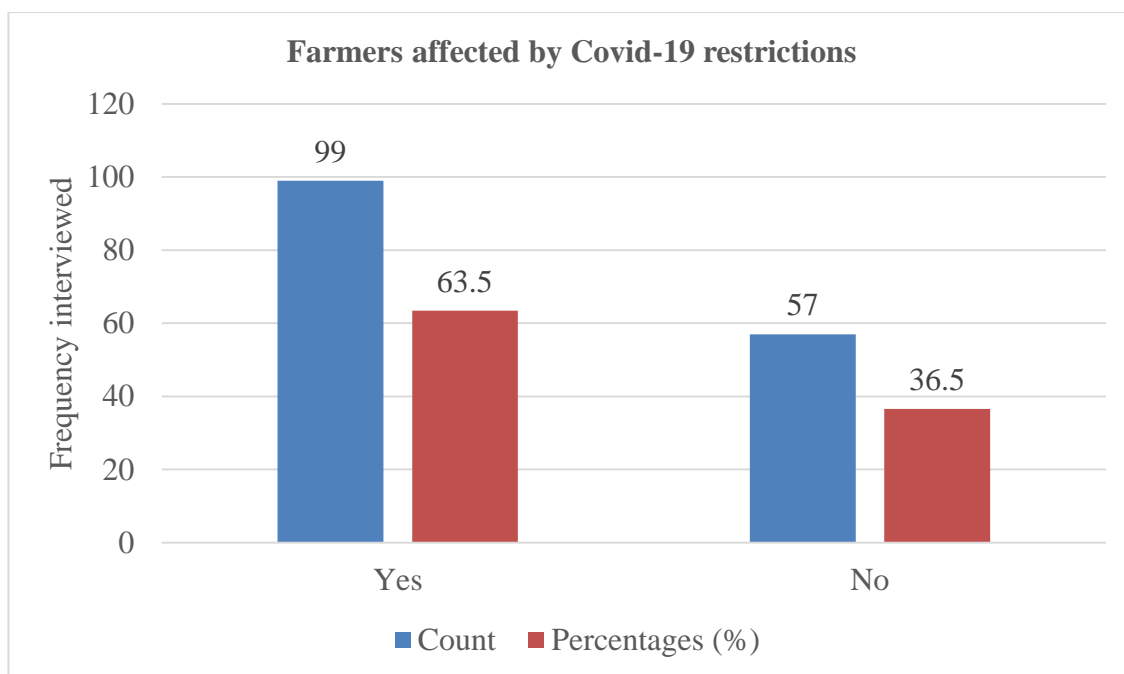
Figure 4. 19 Farmers affected by Covid-19 restrictions

Market channels of choice

Table 4.23 shows the farmers who frequent various market channels. The data indicates that 60 (38.5 %) reported that they have made deliveries to the major town markets. Farmers making deliveries to the local markets were observed at 138 (88.5 %). This finding is consistent with the 132 (106 +26) farmers who live within a distance of 40km from the market. Two (1.3 %) have delivered to a supermarket or retail chain, while 36 (23.1 %) have sold to brokers who would then deliver products at the various markets. This shows that farmers frequent village markets the most.
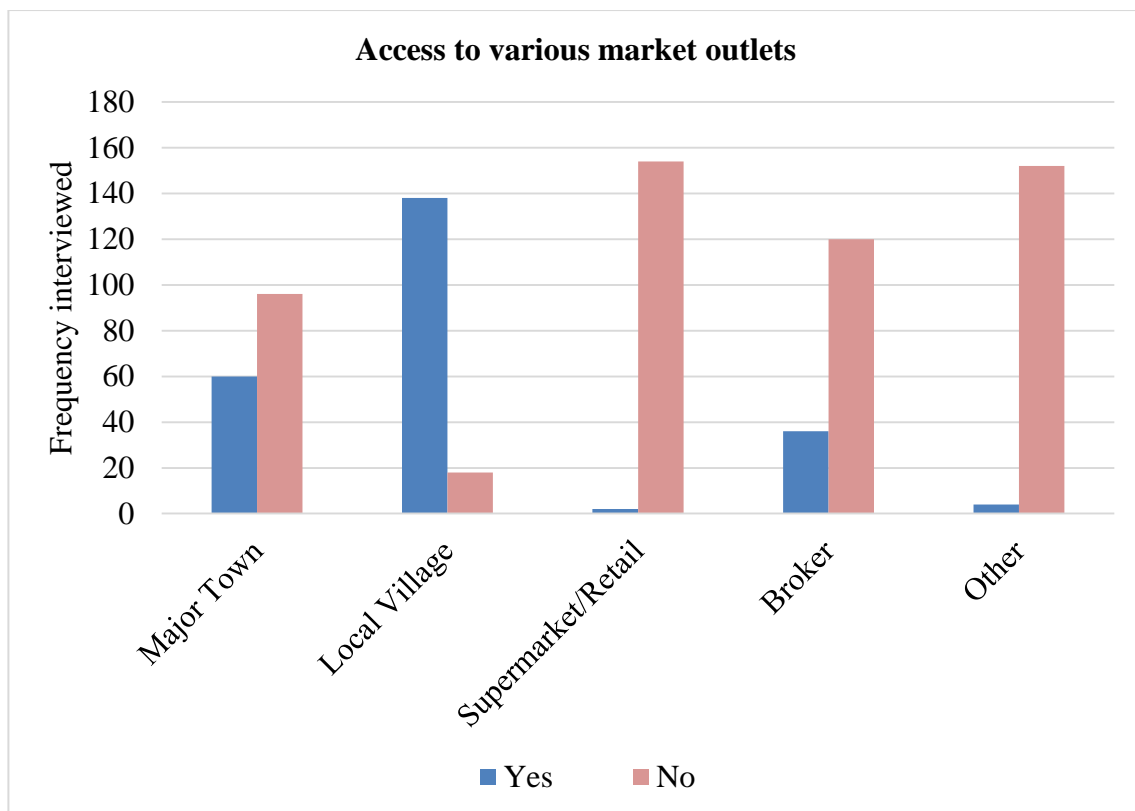
Figure 4. 20 Frequencies to various market outlets

Factors That Influence Access to Markets Parameter Estimates

The table below shows the results of the Probit test. The results were run on a 95 % confidence interval giving a 0.05 % margin of error. Processed Price Per Kilo, Bad Roads, Distance To Market, Tax Fees, Transport Cost showed chi-square test results below 0.05, indicating that these factors were critical in determining access to markets for farmers in Shurugwi. The results of the Probit are described by the coefficients and the significance level.

Table 4. 14 Factors That Influence Access to Markets Parameter Estimates

Parameter Estimates							
			95 % Wald Confidence Interval		Hypothesis Test		
Parameter	B	Std. Error	Lower	Upper	Wald Chi-Square	df	Sig.
Q3QuantityOfTomatoes	4.235E-6	6.4216E-6	-2.078E-5	1.231E-5	.435	1	.041
Q3ProcessedPricePerKilo	1.937	.8190	-.173	4.047	5.593	1	.018
Q8BelongToFarmerOrganization	.250	.3473	-.644	1.145	.520	1	.471
Q10BadRoads	-.700	.3078	-1.493	.093	5.169	1	.023
DistanceToMarket	-.686	.1600	-1.098	-.274	18.402	1	.000
QE2ReceiveMarketInformation	.062	.3347	-.800	.924	.034	1	.854
Q3ExtensionServices	-.115	.2599	-.784	.554	.196	1	.658
TaxFees	-.435	.3801	-1.414	.544	1.308	1	.043

TransportCost	-.714	.2209	-1.283	-.145	10.456	1	.001
QD7AccessToColdRooms	-.283	.8745	-2.536	1.969	.105	1	.746
(Scale)	1ᵃ						

Dependent Variable: Q3SellToMajor

Model: (Intercept), AgeOFHH, Q5HouseholdSize, Q6EducationLevelForHH, Q3QuantityOfTomatotes, Q3ProcessedPricePerKilo, Q10OtherworkIncome, Q3NumberOfLivestockKept, Q8BelongToFarmerOrganization, Q10BadRoads, DistanceToMarket, QE2ReceiveMarketInformation, Q3ExtensionServices, TaxFees, TransportCost, QD7AccessToColdRooms

a. Fixed at the displayed value.

Quantity tomatoes produced

The output of tomatoes produced has a positive coefficient (4.235E-6) showing that an increase in the production of tomatoes improves access to markets. This factor was highly significant (P< 0.05) showing a strong relationship between tomato production and access to high-value markets. Abate *et al.,* (2019) also found similar results thereby recommending that farmers should increase the output of products to enhance market participation. Similarly, Sigei (2014) highlighted the same necessity that critical quantity has to be achieved to motivate farmers to access high-value pineapple markets

Processed price per kilo

The price of tomatoes has a positive coefficient (1.937) as expected from the Apriori assumptions, and is significant (p<0.05). This shows that high-value market participation is increased as the price of tomatoes increases. This is because farmers will pursue markets of a higher value if prices are good. It however follows that if prices are depressed, farmers will only produce for their local markets. This accession was also observed by Fischer and Qaim, (2012) as well as by Ouma *et al.,* (2010), and that the effectiveness of better pricing in the high-value markets will always be attractive to farmers and will even motivate them to produce bigger quantities.

Belong to farmer organization

The coefficient for farmer organization was positive (.250), and not significant (P>0.05). This shows that belonging to a group whole had a positive relationship, was not critical in deciding for market participation. Maspaitella *et al.,* (2018) found a positive relationship

between membership to a farmer group and market access. In another study, Birthal and Joshi (2007) noted that farmer cooperatives influenced farmers to participate in markets. This was due to the observation that cooperatives were formed for community empowerment initiatives. This was also consistent with who also Kyaw *et al.,* (2018) who attributed this to the role of social networking that farmer groups play to enhance marketing.

Bad roads

Apriori assumptions expected bad roads to have a negative coefficient. The study found that roads had a negative relationship (-.700), and was highly significant (P<0.05) with access to high-value markets. The poor quality of roads was observed to be one of the important factors in deciding to access high-value markets, with farmers opting for their local village markets. A similar finding was also observed by Akrong *et al.,* (2021) where roads were seen to contribute positively to accessing markets while bad roads have a negative effect.

Distance to market

Distance to markets was expected to have a negative coefficient in the *Apriori* assumptions. Distance to markets was seen to have a negative relationship in accessing markets (-.686) and highly significant (P<0.05). This shows that the longer the distance to the markets, the less likely farmers will access that market. This is already observed that the implications of the bad road also significantly discourage farmers from accessing high-value markets, thereby compounding the decision for local markets. This observation was also observed by Kyaw et al. (2018) who concluded that farmers would rather sell at local

markets due to challenges in accessing far markets. They can use alternative cheap transport such as cards, bicycles, thought these would carry small quantities of produce. Omiti *et al.,* (2009) made a similar observation but also added that distance confines farmers to less perishable products.

Receive market information

Receiving market information was observed to have a positive relationship (.062) in accessing high-value markets as hypothesised. However, this factor was not significant (P>0.05). The implication is access to markets while positively related to accessing markets was of secondary importance because other issues such as road access, quantity supplied and distance were some of the major factors. Similar observations were noted by Apind *et al.,* (2015) who also realized that receiving market information increases awareness and knowledge to the farmers though not a key factor in the choice of markets if there are other significant barriers.

Extension officers

Extension services offered by AGRITEX were seen to have a negative coefficient (-.115). This is in contrast to the Apriori expectations that the relationship would be positive. This factor was noted to be insignificant (P>0.05). The findings were contradicting other studies such as Kyaw *et al.,* (2018), Chamboko *et al.,* (2017), and Mukwevho and Anim, (2014) who observed a positive coefficient in access to extension services and marketing. Conclusions that can be drawn from this is that Extension services were primarily focusing on production methods and very little on marketing. In addition, there was a lot of promotion of food security crops such as wheat, maize, small grains, and beans to the

Grain Marketing Board (GMB) and less on horticultural crop production hence the negative relationship. This is also related to the implications of bad roads, high cost of transportation, and distance to high-value markets that discourage farmers from perishable crop production.

Tax fees

Tax fees were seen to be negative (-.435) and highly significant (p<0.05). The imposition of levies as local council tax, Value added tax, discouraged farmers from participating in these high-value markets. These costs increased the transaction costs as noted by Jebesa (2019) and had a negative effect on the decision to access high-value markets. Farmers, therefore, opted to their local markets that have either low tax requirements or could sell from their homes or find innovative methods of evading any tax or levies.

Transport cost

The cost of transportation has a negative coefficient (-.714) and is highly significant (P<0.05) showing that increasing transport costs had a negative impact on accessing high-value markets. It has already been attributed that the state of the road has discouraged farmers, and transport costs are observed to be compounding the challenge of access to markets. This was also observed by Aku *et al.,* (2018) who also concluded that increasing transport costs create challenges for farmers to access markets. However, farmers in that study reduced costs by sharing transport.

Access to cold rooms

Access to cold rooms was observed to have a negative coefficient (-.283) and highly not significant (.746). This shows that while failure access to cold chains was an important factor, this was not critical for farmers to decide on accessing markets. Farmers preferred to market unripe tomatoes, which will ripen at the marketplace or with consumers, thereby reducing loss to spoilage. Farmers also preferred to use crop varieties that would stay longer without spoiling.

4.3.4 Result 3: To evaluate whether male and female smallholder farmers have equal access to high-value tomato markets.

Measurements in this objective were aimed at assessing any differences in male and female participation in accessing high-value markets. The focus was aimed at deriving any particular indicators that can be derived from the particular gender for further analysis. The table below shows the various statistical presentation showing the gender variable in relation to other factors and their implication in assessing tomato markets.

Gender and Access to information

The data shows that 57 (36.5 %) of the respondents interviewed were women, while 99 (63.5 %) were male counterparts. Further analysis shows that 115 farmers reported that they receive market information. Of those 115 farmers, 70 (60.9 %) were male farmers while 45 (39.1 %), showing that fewer women had access to information than men did.

Table 4. 15 Gender and Receive Market Information Crosstabulation

Q1Gender and QE2ReceiveMarketInformation Crosstabulation

Count

		QE2ReceiveMarketInformation		
		Yes	No	Total
Q1Gender	Male	70	29	99
	Female	45	12	57
Total		115	41	156

Table 4. 16 Gender and access to information Crosstabulation

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	1.268[a]	1	.260		
Continuity Correction[b]	.878	1	.349		
Likelihood Ratio	1.296	1	.255		
Fisher's Exact Test				.345	.175
Linear-by-Linear Association	1.260	1	.262		
N of Valid Cases	156				

88

a. 0 cells (0.0 %) have an expected count less than 5. The minimum expected count is 14.98.

b. Computed only for a 2x2 table

Gender and access to major markets

The table below shows that 60 farmers reported that it was easy for them to find a ready

market. However, 44 (73.3 %) of the farmers were male and 16 (26.7 %) were women.

Showing that women had reduced chances of getting access to major markets market.

Table 4. 17 Gender and Sell to Major Crosstabulation

Q1Gender and Q3SellToMajor Crosstab				
Count				
		Q3SellToMajor		
		Yes	No	Total
Q1Gende r	Male	44	55	99
	Female	16	41	57
Total		60	96	156

The Chi test results below show the significance of the cross-tabulations between Gender

and Sell to a major market. The test result P=0.031<0.05 shows that this is significant in

addressing challenges that women face in accessing markets as compared to men.

Table 4. 18 Chi-Square Tests results from Gender and Sell To Major Crosstabulation

Chi-Square Tests					
	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	4.098[a]	1	.043		
Continuity Correction[b]	3.435	1	.064		
Likelihood Ratio	4.188	1	.041		
Fisher's Exact Test				.060	.031
Linear-by-Linear Association	4.071	1	.044		
N of Valid Cases	156				
a. 0 cells (0.0 %) have an expected count less than 5. The minimum expected count is 21.92.					
b. Computed only for a 2x2 table					

Annual Sales Value Group Statistics

Crop output was observed for both males and females. Men produced a mean sales value of USD 4.086 while women sales were observed with a mean of USD 4.642, showing that women sold USD 555.9 more than men, further strengthening a commonly held view that women and better producers than men.

Table 4. 19 Annual Sales Value Group Statistics

Q3AnnualSalesValue Group Statistics					
	Q1Gender	N	Mean	Std. Deviation	Std. Error Mean
Q3AnnualSalesValue	Male	99	4085.7576	3370.63038	338.76110
	Female	57	4641.6667	4831.98415	640.01194

Table 4. 20 ANOVA Table Annual Sales Value Group Statistics

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
							Mean Differen ce	Std. Error Differen ce	95% Confidence Interval of the Difference	
		F	Sig.	t	Df	Sig. (2-tailed)			Lower	Upper
Q3AnnualSalesValue	Equal variances assumed	4.576	.034	-.843	154	.400	-555.909 09	659.225 44	-1858.20 107	746.38 289

				-.768	87.834	.445	-555.90909	724.13698	-1995.01702	883.19884
Equal variances not assumed										

The table showed the ANOVA test results for sales for women. The F statistics is 4.576 and is significant at P= 0.034 meaning that we reject the hypothesis H_0- Gender does not affect accessing the high-value market and accept H_3 - Gender influences accessing the high-value market.

4.3 Summary

The chapter showed presented the data using descriptive and inferential statistics to analyze the data factors that determine access to markets. A survey sample of 156 smallholder farmers was used with a 100 % response rate. From the 156 smallholder farmers, it was noted that 57 (36.5 %) of the respondents interviewed were female, while 99 (63.5 %) were male.

The outcome equation used to analyse the data used was:

Access to high-value markets (Y_i) = b_0 + b_1Age + b_2Edu + b_3Hsize + b_4Output + b_5Price + b_6Total In + b_7Ownlivestock + b_8Org + b_9Road + b_{10}Distmk + b_{11}Ext + b_{12}Markinfo + b_{13}TaxPay + b_{14}PayPeriod + b_{15}TransCosts+ b_{16}ColdCha

A Probit regression method was used to analyse the data in SPSS version 26. Various descriptive statistics such as frequencies, mean, modes, median were used to analyse data while chi-square tests, F tests, T-tests were used to analyse the strength of the equation.

CHAPTER 5 SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

5.1 Introduction

Tomato growing and marketing in Zimbabwe has been realized to be one of the highly profitable businesses in the horticultural sector. The choice of Shurugwi as a region for the study was made based on the realization of scarcity and high pricing of tomatoes in the surrounding areas. The major purpose of the study was to assess the determinants of access to markets for tomato farmers. The study focused on quantitative approaches. Descriptive statistics and econometric models were used to analyze the extent to which socioeconomic factors influenced access to markets for smallholder tomato farmers.

This section highlighted the results and their implications on tomato marketing. Each objective was analyzed to measure the relationships of socio-economic factors and access to markets. The predicted hypothesis was also reviewed to assess if the assumption made were valuable or not. The chapter went further to discuss the implications and recommendations that can be made to improve market access.

5.2 Discussion

The study highlighted socioeconomic and value chain factors that influenced access to markets for smallholder farmers. The results were far-ranging and were verified by statistical and econometric analysis to verify the data. Socio-economic factors such as household size, age, gender, education level, household size, household income, number of livestock kept were assessed to highlight any relationship that exists in access to high-value markets.

Positive and significant factors

The output of tomatoes produced had a positive coefficient showing that an increase in the production of tomatoes improves access to markets. This factor was highly significant, showing a strong relationship between tomato production and access to high-value markets.

The price of tomatoes had a positive coefficient as expected from the *Apriori* assumptions, and was significant. This highlighted that high-value market participation increased as the price of tomatoes increased.

Negative and significant factors

The size of the household had a negative coefficient. This showed that an increase in household size has a reduction in the likeliness to participate in high-value markets. This factor showed that household size has a key factor in preventing access to markets This is due to the fact that the larger the household, the more options for alternative income and reduced reliance on tomato marketing. This is consistent with the finding of Adams *et al.,*(2021).

The study observed that the quality of roads had a negative relationship, and was highly significant. The poor quality of roads was observed to be one of the important factors in deciding on access to high-value markets, with farmers opting for their local village markets. *A priori* assumptions expected the quality of roads to have a negative coefficient.

Distance to markets was expected to have a negative coefficient in the *Apriori* assumptions. Distance to markets was seen to have a negative relationship in accessing

markets and was highly significant. This revealed that the longer the distance to the markets, the less likely farmers will access that market

Tax fees were seen to be negative and highly significant. The imposition of levies as local council tax, Value added tax, discouraged farmers from participating in these high-value markets. The cost of transportation had a negative coefficient and was highly significant showing that increasing transport costs had a negative impact on accessing high-value markets.

However, 99 (63.5 %) smallholder farmers reported that they were negatively affected by the implications of the Covid-19 lockdown and the unpredictability and uncertainty of rules around Covid-19. 57 (36.5 %) alluded to the fact their proximity to their local markets did not affect them as they were within the accepted guidelines of the movement restrictions. In addition, the exemption of agriculture as an essential service gave some degree of freedom for farmers to access markets.

Positive non-significant factors

The coefficient for farmer organization was positive, and not significant. This indicated that belonging to a group whole, having a positive relationship, was not critical in deciding for market participation. Receiving market information was observed to have a positive relationship in accessing high-value markets as anticipated in the Apriori assumptions. However, this factor was not significant.

The number of livestock had a positive coefficient but this factor is not significant. It showed that there is a positive relationship between livestock ownership and high-value market participation.

Negative non-Significant factors

Education for the head of the household had a negative coefficient, showing that the more educated the head of the household was, the less likely they were in accessing high-value markets. This factor is highly insignificant. One of the factors that influence access to markets is higher quantities of tomatoes produced. Farmers with a higher level of education and numeracy are noted to have other sources of income other than agriculture and therefore will not depend solely on tomato production. Their small quantities produced will restrict them to local markets. This is consistent with the finding of Adams *et al.,*(2021).

The coefficient of other work income was negative showing that if a farmer has other work income, this contributes negatively to their participation in the high-value market. However, this factor was not significant showing that this was not a critical factor in the outcome equation. This was introduced into the equation as a dummy variable.

Interestingly, extension services offered by AGRITEX were seen to have a negative coefficient. This was in contrast to the *Apriori* expectations that the relationship would be positive. This factor was noted to be insignificant.

Access to cold rooms was observed to have a negative coefficient and highly not significant. This reflected that while failure to access cold chains was an important factor, this was not critical for farmers to decide on accessing markets.

5.3   Conclusions

The data collected and analyzed was able to show a trend in the behavior of smallholder farmers in accessing high-value markets. From the outcome equation, it can be noted that some of the expected independent variables were not significant in determining access to markets for tomato farmers. The use of various descriptive and analytical statistics showed a diverse method of presenting the data to fully understand the factors that are critical in deciding access to markets for the farmers. The data showed that the following factors were significant in the outcome equation: the size of the household education for head of the household, price of tomatoes, quality of roads, distance to markets, local council tax fees, cost of transportation.

A review of the research hypothesis:

i. H_0- There is no relationship between socio-economic factors and access to high-value markets

H_1- There is a relationship between socio-economic factors and access to high-value markets.

It was noted that the F tests in analysis of variance, analysis of covariance, linear regression, chi-square, and logistics regression. The test result (P>0.000) shows that the factors in the model are significant in measuring the outcome of the equation, and have strong explanatory power in factors that determine access to markets. The rest, therefore,

shows that we can reject the null hypothesis and accept that there is a relationship that exists between socio-economic factors and access to high-value markets.

ii. H0- Gender does not affect accessing the high-value market.

H3- Gender influences accessing the high-value market.

The ANOVA test results for sales for women. The F statistics is 4.576 and is significant (P= 0.034) meaning that we reject the hypothesis H_0- Gender does not affect accessing the high-value market and accept H_3 - Gender influences accessing the high-value market.

5.4 Implications

Shurugwi district has been noted to have an increase in mineral mining participation. A key observation has been noted in low productivity in horticultural crop production. One of the observations in the study was the fact that irrigation systems are underutilized, while others are defunct. This trend will not change until the government, private sector, and NGO interventions are made to turn around the fortunes of these facilities. A household Agricultural model needs to be implemented to boost horticultural; production. This research can assist in discussion around framing a new approach in horticulture production and addressing gaps in the socio-economic characteristics to boost production and assess markets

Poor road networks are affecting the ease of doing business in the district and they are getting worse. The rainy season that was experienced in the 2020/21 season has left the roads in a worse off state that will require a significant budget allocated to rehabilitate. This however will leave farmers in a conundrum on whether they soldier on with

horticultural crop production and make marginal gains or abandon production and only participate in food security crop production, which in any case deliveries are made to Tongogara GMB depot, and with the supported transport system. This research can motivate the formation of the aggregation facilities, closer to farmers to enhance road access.

Coupled with the challenge of poor quality of roads, is the cost of transportation that also increases. The implication of COVID-19 brought a ban on kombis not registered with ZUPCO has increased transport shortage and therefore driving the cost of transportation through illegal pirating vehicles. This is further prohibiting the movement of farmers with their products to markets due to the high cost of transportation. Farmer groups can form transport-sharing arrangements that will address the issue of availability and cost.

The region already experiences scarcity of horticultural produce, with supplies coming as far as Harare, ferried on buses. This will further push the cost of these commodities high due to the distance they gave travelled and still become a burden of affordability for the local consumers. Sufficient produce will enhance a fair pricing regime, affordable by local consumers, and significant quantities to attract high-value market participants who are often in pursuit of bigger sustainable quantities.

Women face vulnerability and abuse due to poor access to income as a result of their low economic status. This vulnerability will increase and the inequality gap between men and women will continue to widen if no interventions are put in place. Communities are increasingly becoming more vulnerable due to the poor economy and the impact of COVID-19. This will further exacerbate the plight of women and still see them weakened

and entirely dependent on their male counterparts. Women empowerment training, mentorship programs need to be emphasized and renew the spirit of the United National Beijing Declaration on Women's rights.

5.5   Recommendations

The study highlighted several gaps that exist in tomato marketing. The fourth objective for the study: To recommend strategies that can be put in place to improve smallholder farmers' access to high tomato value markets was then answered in this section. The recommendations for the study have been split three-way in line with the objectives.

i.   **To analyze the socioeconomic characteristics of the individual smallholder tomato farmers that influence access to markets in Shurugwi.**

There is a need for collaborative efforts for the government and private sector to promote market systems development for tomato production at the local level. Strategies such as tomato contract framing and the creation of tomato production hubs or value chain processing centres will be relevant. This is to boost household participation through an Agricultural Household Model (AHM) in increasing the critical mass to attract private sector participation.

Interest in farming is slowly shifting with noted low participation from young people who presumably are attracted to artisanal gold mining. Incentives for participation can be developed through infrastructure development in partnership with institutions such as the Agricultural and Rural Development Authority (ARDA), Agricultural Marketing Authority (AMA), Zimbabwe Irrigation Technology Centre (ZITC) European Union (EU) improving water conveyance systems in irrigation schemes. Input supplies should be

supported with low-cost financing and adequate skills and knowledge in tomato production.

ii. To study the business logistics factors affecting access to tomato marketing in high-value markets.

Price of tomatoes, distance to markets, cost of transportation to markets, quality of roads, and payment of taxes and levies, were noted to negatively affect market participation. Travel restrictions due to the impact of Covid 19 were also noted to be impeding access to markets.

There is a need to create mobile aggregation centers where buyers come to collect produce from groups of farmers. This will address the issues of travel costs, distance to markets, and having to deal with poor quality roads. The prices for the buyers will then be pegged in a way that will factor in the costs of traveling to those sights. A fair pricing system will need to be negotiated with farmer representatives and the buyers. In the long-run value, chain processing centers will need to be developed. These will be installed with processing facilities such as drying, canning for value addition.

A noted number of irrigation systems were dysfunctional with the functional ones operating at low capacity. There is a need to boost production in these areas to attract the participation of the private sector through partnerships with the Zimbabwe Agricultural Development Trust (ZADT). This will enable the formation of contract farming arrangements, aggregation, and road development. This will eventually improve the production systems, improve the quality of the products and in turn strengthen the tomato

value chain. Local tomato prices will become at par with the high-value market prices and therefore still allow farmers to reap better profits.

Farmers' groups must be supported to form trusts that will manage the local aggregation and value chain processing centers and be supported to run the affairs of the value chain development. This will facilitate a process where farmers can engage local government authorities in collaboration with UNDP who run resilience programs in improving the quality of roads, provision of adequate transportation to allow easy and efficient passage of tomatoes and other horticultural products.

iii. To evaluate whether male and female smallholder farmers have equal access to high-value tomato markets.

Women's participation in the market was noted to be low relative to men, there is a need to engage the Ministry of Women Affairs, Community, and SME Development to facilitate empowerment education for both men and women to address the gender gap. Women empowerment groups should be strengthened with the support of NGOs, development partners, and government to improve documentation of women, skills, and knowledge building to improve their participation in markets. The issue of public-private partnerships is critical in improving a systems approach as noted by Paresh and Ali (2019).

Women-only groups need to be championed and supported to form registered groups that can be subcontracted for tomato production, or even participate as Export Processing Zones (EPZ). This will demonstrate a model of how women can be supported in local-level development equally as men. The private sector can also be sensitized to then offer

tailor-made Corporate Social Responsibility programs aimed at supporting women and young people to boost their participation in tomato production and horticulture in general.

Other initiatives such as access to market information can be supported using community ICT devices, that can be shared through women groups. This will enable women to know the trends in tomato and horticultural marketing. They will then be assisted to access these markets through organized transport arrangements to markets that are pro-women and gender-responsive.

5.6 Suggestions for further research

The study was designed to assess the determinants of access to markets for smallholder tomato farmers. Socio-economic characteristics of the farmers were examined using an econometric model to evaluate what key factors influence access to farmers.

The study was based on the quantitative aspects that affect the value chain. The research approach was purely abductive. The researcher was looking into the behavior of the farmers. However, during the research, there were areas associated with gender in markets access, knowledge, and business documentation for accessing high-value markets that needed qualitative research methodologies to go beyond the surface to examine. There is a need therefore to have a women-only focused study to analyze the reasons why women are generally not accessing high-value markets.

The study also highlighted extension services as having a negative influence on access to high-value markets. This came at the back of observations that most extension services were geared toward food security crop production to fulfill the goals of Command

Agriculture. There is a need to research the impact of Command agriculture on the production of other crops

Further areas for the study are to analyze the age implication in accessing markets for younger farmers below the age of 35. The study can start from the perceptive of access to land for young people. This study did show that the farmers interviewed have a mean age of (50.02). It was interesting to note that few young people were involved with tomato production. Therefore the focus of the study was to evaluate factors that influence youth participation in horticulture perhaps focusing more closely on tomato production.

REFERENCES

Abate, T. M., Mekie, T. M., & Dessie, A. B. (2019). Determinants of market outlet choices by smallholder teff farmers in Dera district, South Gondar Zone, Amhara National Regional State, Ethiopia: A multivariate probit approach. *Journal of Economic Structures*, 8(1), 1-14. Retrieved from https://doi.org/10.1186/s40008-019-0167-x

Adams, F., Wongnaa, C.A. and Coleman, E. (2021), "Profitability and choice of marketing outlets: evidence from Ghana's tomato production", *Journal of Agribusiness in Developing and Emerging Economies*, Vol. 11 No. 3, pp. 296-312. https://doi.org/10.1108/JADEE-06-2019-0090

Ahn, C., Heo, M & Zhang, S. (2014) *Sample Size Calculations for Clustered and Longitudinal Outcomes in Clinical Research*, Florida, CRC Press

.Akrong, R., Mbogoh, S. G., & Irungu, P. (2021). What factors influence access to and the level of participation in high-value mango markets by smallholder farmers in Ghana? *Journal of Heliyon Cell Press*, 7(3), 3-9. Retrieved from https://doi.org/10.1016/j.heliyon.2021.e06543

Aku, A., Mshenga, P., Afari-Sefa, V., & Ochieng, J. (2018). Effect of market access provided by farmer organizations on smallholder vegetable farmers' income in Tanzania. *Journal of Cogent Food and Agriculture*, 4(1), 2-13. Retrieved from https://doi.org/10.1080/23311932.2018.1560596

Apind, B. O., Lagat, J. K., Bett, H. K., &Kirui, J. K. (2015). Determinants of Small-holder

  Farmers Extent of Market Participation; Case of Rice Marketing in Ahero

  Irrigation Scheme, Kenya.

Assefa, G. A.,& Deresse, Y. S. (2021). Value Chain and Market Participation of Maize in

  North Gondar Zone, Ethiopia [Preprint]. In Review. Retrieved from

  https://doi.org/10.21203/rs.3.rs-339650/v1

Barrett, C. B., & Mutambatsere, E. (2008). Agricultural markets in developing countries.

Bellemare, M. F., & Barrett, C. B. (2006). An ordered Tobit model of market participation:

  Evidence from Kenya and Ethiopia. A*merican journal of agricultural economics,*

  88(2), 324-337.

Bernstern, R., Chamboko, T. & Mubvuta, D. (2011) Horticultural sector in Zimbabwe: A

  synthesis of key issues. *United States Agency for International Development*

  Publications.

Bijman, J., Ton, G., & Meijerink, G. (2007). Empowering Smallholder Farmers in

  Markets: *National and International Policy Initiatives.*

Birthal, P. S., & Joshi, P. K. (n.d.) (2007). Smallholder Farmers' Access to Markets for

  High-Value Agricultural Commodities in India. *Food Policy For Developing*

  Countries: The Role Of Government In The Global Food System. Agricultural

  Economics Research Review (20) 425-439. Retrieved from

  https://hdl.handle.net/1813/55690

Boughton, D., Mather, D., Barrett, C., Benfica, R., Abdula, D., Tschirley, D., & Cunguara,

B. (2007). Market Participation by Rural Households in a Low-Income Country:
An Asset-Based Approach Applied to Mozambique. *Faith and Economics*. (50),
64-101

Chamboko, T., Mwakiwa, E., & Mugabe, P. H. (2017). Determinants of Milk Market

Participation and Volume of Sales to Milk Collection Centres of the Smallholder
Dairy Value Chain in Zimbabwe. *Journal of Agricultural Science*, 9(10), 156-167.
Retrieved from https://doi.org/10.5539/jas.v9n10p156

Chigusiwa, L., Bindu, S., Muchabaiwa, L., & Mudavanhu, V. (2013). The Role of Market

Middlemen in the Marketing of Smallholder Horticultural Products in Zimbabwe.
Greener Journal of Business and Management Studies, 3(8), 369–377. Retrieved
from https://doi.org/10.15580/GJBMS.2013.8.110113944

Chiputwa, B., & Qaim, M. (2016). Sustainability Standards, Gender, and Nutrition among

Smallholder Farmers in Uganda. *The Journal of Development Studies*, 52(9),

1241–1257.Retrieved from https://doi.org/10.1080/00220388.2016.1156090

Cooper, D. R., & Schindler, P. S. (2014). *Business research methods* (Twelfth edition).

McGraw-Hill/Irwin.

Digal, L. N. (2011). Linking Smallholder Rural Producers to High-Value Markets: The

Role of Technical Assistance and Credit. *Banwa*, 6(1), 47–62. Retrieved from
https://doi.org/10.3860/banwa.v6i1.1957

Ellis, F. (2005). Small-Farms, Livelihood Diversification and Rural-Urban Transitions:

　　Strategic Issues in Sub-Saharan Africa.

Fischer, E., & Qaim, M. (2012). Linking Smallholders to Markets: Determinants and

　　Impacts of Farmer Collective Action in Kenya. *World Developmen*t, 40(6), 1255–

　　1268. Retrieved from https://doi.org/10.1016/j.worlddev.2011.11.018

Gor, S. O. (2012). An assessment of the informal sector trade in Kenya. The Estey Centre.

　　Journal of International Law and Trade Policy, 13(1), 102-114.

Government of Zimbabwe, (2012). Comprehensive agricultural policy framework (2012-

　　2032).www.g-fras.org/en/policy-templates/category/?...agricultural-policy.

　　Accessed on 3/9/21.

Government of Zimbabwe, (2018). Zimbabwe Agriculture National Policy draft (2018).

　　http://www.livestockzimbabwe.com/Updates/Draft-

　　%20Zimbabwe%20Agriculture%20National%20Policy%20Framework.pdf.

　　Accessed on 19.9.21

Heckman, J. J. (1976). The common structure of statistical models of truncation, sample

　　selection, and limited dependent variables, and a simple estimator for such models.

　　In *Annals of economic and social measurement, volume 5, number 4* (pp. 475-

　　492)Heltberg R., & F. Tarp, F. (2002). Agricultural Supply Response and Poverty

　　in Mozambique. *Food Policy*, 27(1), 103-124.

Holloway, G., Barrett, C. B.,& Ehui, S. (2005) Bayesian estimation of the double hurdle

model in the presence of fixed costs. *Journal of International Agricultural Trade and Development*, 1 (1), 17-28.

Jayne, T., Mather, D., & Mghenyi, E. (2010). Principal Challenges Confronting Smallholder Agriculture in Sub-Saharan Africa. *World Development*, 38, 1384–1398. Retrieved from https://doi.org/10.1016/j.worlddev.2010.06.002

Kaushik, V., & Walsh, C. A. (2019). Pragmatism as a Research Paradigm and Its Implications for Social Work Research. *Social Sciences*, 8(9), 255. Retrieved from https://doi.org/10.3390/socsci8090255

Kilelu, C., Klerkx, L., Omore, A., Baltenweck, I., Leeuwis, C., & Githinji, J. (2017). Value Chain Upgrading and the Inclusion of Smallholders in Markets: Reflections on Contributions of Multi-Stakeholder Processes in Dairy Development in Tanzania. *The European Journal of Development Research*, 29(5), 1102–1121. https://doi.org/10.1057/s41287-016-0074-z

Kirszner, L. G., & Mandell, S. R. (2016). *The Concise Cengage Handbook. Cengage Learning,* Cengage Learning.

Kyaw, N., Ahn, S., & Lee, S. (2018). Analysis of the Factors Influencing Market Participation among Smallholder Rice Farmers in Magway Region, Central Dry Zone of Myanmar. *Sustainability*, 10(12), 2-15. Retrieved from https://doi.org/10.3390/su10124441

Lim, W.M., & Hooi Ting, D.H. (2013). R*esearch Methodology: A Toolkit of Sampling*

and Data Analysis Techniques for Quantitative Research, Munich, GRIN Verlag.

Maarouf, H. (2019). Pragmatism as a Supportive Paradigm for the Mixed Research

Approach: Conceptualizing the Ontological, Epistemological, and Axiological

Stances of Pragmatism. *International Business Research*, 12(9), 1-12. Retrieved

from https://doi.org/10.5539/ibr.v12n9p1

Maspaitella, M., Garnevska, E., Siddique, M. I., & Shadbolt, N. (2018). Towards high-

value markets: A case study of smallholder vegetable farmers in Indonesia.

International Food and Agribusiness Management Review, 21(1), 73–88.

Retrieved from https://doi.org/10.5539/ibr.v12n9p1

Mhlanga, D. *(n.d)* (2020) Financial inclusion, and poverty reduction: Evidence from small

scale agricultural sector in Manicaland Province of Zimbabwe Retrieved

November   23,   2021,   from

https://repository.nwu.ac.za/bitstream/handle/10394/34656/Mhlanga

_D_31429505

Mhlanga, D.,& Ndhlovu, E. (2020). Socio-economic Implications of the COVID-19

Pandemic on Smallholder Livelihoods in Zimbabwe [Preprint]. Social Sciences.

Retrieved from https://doi.org/10.5539/ibr.v12n9p1

Mouncey, P. (2010) Revisions to the Market Research Society (MRS) Code of Conduct.

Journal of Direct, Data and Digital Marketing Practice 12, 179–180. Retrieved

from https://doi.org/10.1057/dddmp.2010.31

Morgan, D.L. (2013). Integrating Qualitative and Quantitative Methods: A Pragmatic

    Approach. California: SAGE Publications.

Mukwevho, R., & Anim, F. D. K. (2014). Factors Affecting Small Scale Farmers in

    Accessing Markets: A Case Study of Cabbage Producers in the Vhembe District,

    Limpopo Province of South Africa. *Journal of Human Ecology*, 48(2), 219–225.

    Retrieved from https://doi.org/10.1080/09709274.2014.11906791

Muijs, D. (2015). *Doing Research with Secondary Da*ta, California: SAGE Publications.

Mwakiwa, E., Katema, T., & Vomitadyo, I. (2016). An Economic Analysis of High-Value

    Horticulture Crop Productivity: Green Peas (Pisum sativum) in Zimbabwe.

    Journal of economics and sustainable development, 7, 1-9.

Njaya, T. (2014). The Economics of Fruit and Vegetable Marketing by Smallholder

    Farmers in Murehwa and Mutoko Districts in Zimbabwe. *International journal of*

    research in humanities and social sciences, 1(1), 35-43.

Olwande, J., & Mathenge, M. K. (2012) Market Participation among Poor Rural

    Households in Kenya, 2012 Conference, August 18-24, 2012, Foz do Iguacu,

    Brazil 126711, International Association of Agricultural Economists.

Omiti, J. M., Otieno, D. J., Nyanamba, T. O., & Mccullough, E. (2009). Factors

    influencing the intensity of market participation by smallholder farmers: A case

    study of rural and peri-urban areas of Kenya. 3(1), 1-26.

Ouma, E., Jagwe, J., Obare, G. A., & Abele, S. (2010). Determinants of smallholder

farmers' participation in banana markets in Central Africa: The role of transaction costs. *Agricultural Economics*, 41(2), 111–122. Retrieved from https://doi.org/10.1111/j.1574-0862.2009.00429.x

Paresh, S. (2019). Value Chain Analysis of Tomato: A Case Study in Jessore District of Bangladesh. *International Journal of Science and Research (IJSR)*. 8. 924-932. https://doi.org/10.21275/ART20194747.

Poulton, C., Kydd, J., & Dorward, A. (2006). Overcoming Market Constraints on Pro-Poor Agricultural Growth in Sub-Saharan Africa. *Development Policy Review*, 24, 243–277. Retrieved from https://doi.org/10.1111/j.1467-7679.2006.00324.x

Rapsomanikis, G. (2015). The economic lives of smallholder farmers. *An analysis based on household data from nine countries* Food and Agriculture Organization of the United Nations, Rome.

Refera J, S. (2019). Determinants of Smallholder Farmers Market Participation and Outlet Choice Decision of Agricultural Output in Ethiopia: A Review. *American Journal of Agriculture and Forestry*, 7(4), 139-145. Retrieved from https://doi.org/10.11648/j.ajaf.20190704.13

Rikitu, A., Emana, B., Haji, J., & Bekele, K. (2019). Smallholder Farmers' Decision to Participate in Vegetable Marketing and the Volume of Sales in West Shewa Zone of Oromia National Regional State, Ethiopia. *Sustainable Agriculture Research*, 8(4), 48-60. Retrieved from https://doi.org/10.5539/sar.v8n4p48

Sehar, M. (N.D.). (2018) *Factors Influencing Market Access And Livestock Marketing*

Inefficiency In Mpumalanga Province, South Africa (Masters Thesis) University
of South Africa, South Africa. Retrieved from
http://www.secheresse.info/spip.php?article97330

Sigei, G. K. (N.D.). (2014) *Determinants Of Market Participation Among Small-Scale*

Pineapple Farmers In Kericho County, Kenya. (Masters Thesis) Egerton
University, Kenya. Retrieved from https://mpra.ub.uni-
muenchen.de/id/eprint/56149

Slovin, E. (1960). Slovin's formula for sampling technique. *Retrieved on August 18*, 2021.

Tourangeau, R., Edwards, B., Johnson, T.P., Bates, N. & Wolter, K.M. (2014) Hard-to-

survey Populations. Cambridge: Cambridge University Press.

Walker, J., & Ben-Akiva, M. (2002). Generalized random utility model. *Journal of*

Mathematical social sciences, 43(3), 303-343. Retrieved from
https://doi.org/10.1016/S0165-4896(02)00023-9.

Watkins, D., & Gioia, D. (2015). Mixed Methods Research: Pocket guides to social work

research methods. Oxford: Oxford University Press.

Wolf, C., Joye, D., Smith, T.W., & Fu, Y. (2017). *The SAGE Handbook of Survey*

Methodology. California: SAGE.

Zimbabwe Agricultural Society (2020). Zimbabwe Agricultural Sector Survey 2018-

2019. Inaugural Zimbabwe Agricultural Sector Survey 2018 -2019.

https://www.zimagrihub.org.zw/inaugural-zimbabwe-agricultural-sector-survey-2018-2019. Retrieved 24 November 2021.

Zimbabwe Agricultural Society (2021) Zimbabwe Agricultural Sector Survey 2019-2020.

Second Edition Agricultural Sector Survey. http://www.financialgazette.co.zw/wp-content/uploads/2020/09/Second-Edition-Agricultural-Sector-Survey-2019-2020.pdf. Retrieved 24 November 2021.

Zivenge, E. (2012). Analysis of factors influencing market channel access by communal

horticulture farmers in Chinamora District, Zimbabwe. *Journal of Development and Agricultural Economics,* 4(6), 147-150. Retrieved from https://doi.org/10.5897/JDAE10.070

ZimVAC (2020) '2020 Rural Livelihoods Assessment Report'. Harare: Zimbabwe

Vulnerability Assessment Committee. https:

//fscluster.org/zimbabwe/document/2020 -zimbabwe-vulnerability-assessment

(accessed 23 November 2021).

APPENDICES

Appendix 1: Questionnaire Survey Instrument

This study is designed to assess factors that determine the market participation for smallholder tomato farmers in Shurugwi District. Participation in this study is voluntary. Information shared will be shared with the study supervisor for academic purposes only.

QUESTIONNAIRE IDENTIFICATION

Name of data collector		Questionnaire Number	

A. DEMOGRAPHIC DETAILS

1. **Gender** *(please tick)*		Age	2. **Relation to Household Head** *(please tick)*		3. **Occupation** *(please tick)*	
Male			Head		Farmer	
Female			Spouse		Businessman	
			Child		Employed	
			Relative		Other (state)	
			Other (state)			

4. Marital Status *(please tick)*		5. Household size	6. Highest educational level for the household head.		7. Number of employees who assist with farm work (State number)	
Single			No formal education		Full-time employees	

Married			Primary level		Part-time employees	
Widowed			Secondary level		Family member	
Divorced			Tertiary level			
Other (state)			Others (specify)		Total	

8. Do you belong to any farmer organization?	Yes	No

9. If yes, what services are provided by your farmer organization?				
Access to quality inputs	Production	Processing	Marketing	Other (Specify)

10. Do you have any off-farm employment? *(please tick)* *If no skip the following question*			Yes		No	

Employment status		Net income (USD)					
	Tick	Below 100	101-200	201-300	301-400	401-500	Above 500
Full-time worker							
Part-time worker							
Pensioner							

Other							

B. Land ownership and use

1. What is the tenure system of your farm?		
Tenure	*Tick where appropriate*	**Size in Hectares**
Purchased land		
Family Land		
Rented Land		

2. What is the major reason for growing Tomatoes? *(please tick)*		Consumption		Marketing	
3. List other crops/livestock that you grow apart from tomatoes, and size or number.	Crops *(please list)*	Hectares	Livestock *(please list)*		How many?
	1.Tomatoes		1.		
	2.		2.		
	3.		3.		
	4.		4.		
	5.		5.		

C. Tomato Marketing

1. What quantity of tomatoes (in kilograms) do you produce per hectare every year?		
2. Are your tomatoes graded before marketing?	Yes	No

3. Where do you sell most of your Tomatoes?

Place	Quantity in kilograms per year	Processed price in USD/ kilo	Unprocessed price in USD/ kilo
Major town Market			
Local village market			
Major supermarkets or retail outlets shops (OK, Pick n Pay, Spar, etc)			
Brokers			
Other (state)			

4. Do you always find a ready market for tomatoes produced?	Yes	No
5. If No, what happens to unsold tomatoes produced?		

lost to spoilage	Consume	Sell at a low price	Dry and process

D. Infrastructure and logistics

1. How do you move your product to the market point? (*tick where appropriate*)					
	Type of transport				
	Bicycle	Motorbike	Truck	Local bus	Other (specify)
Own transport					
Hired vehicle (individual)					
Hired vehicle (group)					
Public transport					
Buyer transport					
Provided by Cooperative					
2. What is the distance in kilometers from your farm to the market?					

0-20	21-40	41-60	61-80	81-100	Over 100

3. How much do you pay for a single trip to the market for 100kgs of produce?

0-20	21-40	41-60	61-80	81-100	Over 100

4. Do you pay and additional fees at the market point?				Yes	No
Delivery fees	Tax fees	Broker fees	Grading fees	Inspection fees	Other (specify)

5. Do you have access to cold rooms to keep your tomatoes refrigerated?	Yes	No

6. Does having access to cold rooms improve your business?	Yes	No

7. If the answer is yes, how far (in kilometers) is the nearest cold room where you can store your tomatoes?

0-20	21-40	41-60	61-80	81-100	Over 100

8. What general problems do you experience in moving your produce?

Lack of transport	Small size of transport	High transport cost	Bad/ impassable road	Covid movement restrictions	Others (specify)

List the marketing outlet	9. How are you paid?						Period of payment (in days)
	ZWL			USD		Other	
	Ecocash	Bank	Cash	Bank	Cash		
Major town Market							
Local village market							
Major supermarkets (OK, Pick n Pay, Spar, etc)							
Brokers							
Other (state)							

10. What type of road do you use to the market?		11. How do you rate your road?		12. Are you satisfied with the road links?		13. Is the road well serviced?	
Tarred		Fair		Yes		Yes	
Rough		Bad		No		No	
Mixed		Good		Moderate		Sometimes	

E. MARKETING AND EXTENSION INFORMATION

1. Do you have access to market information?	Yes	No
2. Do you receive market information prior to sale?	Yes	No

3. What are your sources of information?

Sources	Type of information provided						
	Product quality	Prices	Dates for sale	Buyers	Market demand	Market opportunities	Others (specify)
Line ministries							
Buyers							
Extension officers							
Friends							
Co-farmers							
Media							
Others (specify)							

4. How often do you receive the information?							

Daily	Weekly	Monthly	Biannually	Annually	Others (specify)

5. How would you prefer the information to be delivered?					
Text messages	Farmers WhatsApp groups	Radio	Extension officers	Newspapers	Specify (others)

6. Do you have contact with extension officers during the marketing period?				Yes	No
7. If yes, what services are provided by extension officers?					
Access to quality inputs	Production	Processing	Marketing	Other (Specify)	

Thank you for participating

Appendix 2: Africa University Research Ethics Committee Approval

AFRICA UNIVERSITY RESEARCH ETHICS COMMITTEE (AUREC)

Ref: AU1938/21   5 March, 2021

CLEMENT ZVOMUYA
C/O CHANS
Africa University
Box 1320
Mutare

RE: **DETERMINANTS OF SMALLHOLDER TOMATO FARMERS'
PARTICIPATION IN HIGH VALUE MARKETS. CASE OF
HORTICULTURE MARKETING IN SHURUGWI, ZIMBABWE**

Thank you for the above titled proposal that you submitted to the Africa University Research Ethics Committee for review. Please be advised that AUREC has reviewed and approved your application to conduct the above research.

The approval is based on the following.

a) Research proposal
b) Data collection instruments
c) Informed consent guide

- **APPROVAL NUMBER**   AUREC1938/21
  This number should be used on all correspondences, consent forms, and appropriate documents.
- **AUREC MEETING DATE**   NA
- **APPROVAL DATE**   March 5, 2021
- **EXPIRATION DATE**   March 5, 2022
- **TYPE OF MEETING**   Expedited
  After the expiration date this research may only continue upon renewal. For purposes of renewal, a progress report on a standard AUREC form should be submitted a month before expiration date.
- **SERIOUS ADVERSE EVENTS** All serious problems having to do with subject safety must be reported to AUREC within 3 working days on standard AUREC form.
- **MODIFICATIONS** Prior AUREC approval is required before implementing any changes in the proposal (including changes in the consent documents)
- **TERMINATION OF STUDY** Upon termination of the study a report has to be submitted to AUREC.

AFRICA UNIVERSITY
RESEARCH ETHICS COMMITTEE (AUREC)

APPROVED
P.O. BOX 1320, MUTARE, ZIMBABWE

Yours Faithfully

**MARY CHINZOU – A/AUREC ADMINISTRATORFOR CHAIRPERSON, AFRICA
UNIVERSITY RESEARCH ETHICS COMMITTEE**