

**MARKET PARTICIPATION AND WELFARE OF SMALLHOLDER  
FARMERS IN THE EASTERN CAPE PROVINCE SOUTH AFRICA**

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**University of Fort Hare**  
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**THESIS SUBMITTED IN THE FULFILLMENT OF THE REQUIREMENTS FOR A  
DOCTOR OF PHILOSOPHY IN AGRICULTURAL ECONOMICS AT THE UNIVERSITY  
OF FORT HARE  
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DEPARTMENT OF AGRICULTURAL ECONOMICS AND EXTENSION**

**University of Fort Hare**  
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**2021**

## DECLARATION

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I hereby certify that this dissertation is my own original work and has not been submitted to any other university for the purpose of a degree. Where use has been made of the work of others, such work has been duly acknowledged in this text.

Signed .....  ..... Date: ...07/06/2021.....  
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# DEDICATION

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This thesis is dedicated to my children  
Ntsoaki, Neo and Buhle



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I thank the Almighty and Everlasting God, for His Grace and Mercy.

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Glory to God

Mahali Lesala

# MARKET PARTICIPATION AND WELFARE OF SMALLHOLDER FARMERS IN THE EASTERN CAPE PROVINCE SOUTH AFRICA

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## ABSTRACT

The low market participation of smallholder farmers in markets has received enormous attention from scholars, both in the country and the Eastern Cape Province. However, it is not clear how low their market participation is including its implications on farmer's welfare. The purpose of the study was to determine the extent to which smallholder farmers in the homelands of the Eastern Cape participate in output markets and assess how their participation in markets has affected wellbeing of their households. This information will have important practical implications for policy regarding appropriate pathways for poverty alleviation and livelihoods improvements in the rural areas of the Eastern Cape Province. Three irrigation schemes; Qamata, Zanyokwe and Tyefu irrigation schemes were selected for this study. A sample of 210 smallholder irrigators were interviewed by means of a close-ended questionnaire. The data were analysed by means of descriptive statistical tools, the multiple-level choice models and the Propensity Score Matching (PSM) technique. SPSS and STATA computer programmes were used to carry out all the estimations.

The analysis established that, although agriculture is the primary activity for rural livelihoods, it is not the main contributor to family income. Rather, remittances and social grants were the dominant sources of household income in the Qamata, Zanyokwe and Tyefu areas. From the standpoint of market, maize and potatoes are the most popular

crops, but potatoes dominate the market. This result confirms that maize is the staple crop and therefore mostly grown for home consumption while production of potatoes is market-oriented. The Market Participation Index (MPI) revealed that farmers sell at least 55% of their farm produce, implying that farmers have made some transition from subsistence to semi-commercial farming. However, farmers' priority still remains food self-sufficiency and market participation only takes place after satisfying their home food needs. The results revealed that the significant factors influencing the farmers' decisions and their extent of participation in output markets were the age, gender, marital status of the household head, primary occupation of household head, size of farm cultivated, government financial support, access to extension services and farmer's membership of cooperatives. Concerning the impact of output market participation on welfare of smallholders, the Average Treatment on the Treated (ATT) as the measure of change revealed that participation in output markets has a positive impact on welfare of the smallholder farmers through increased incomes. Farmers who participated in output market were at least R838.44 better off than those who did not participate in markets although social grants and remittances made significantly higher contribution to household welfare.



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The study suggests that despite some improvements in income of market participants, the standards of living of the rural households are still far from what would be considered optimal. Crop farming evidently contributes less than desired, hence the persistence of the widespread poverty. It is urgent to focus interventions on improving agricultural productivity while widening strategies for improving rural livelihoods beyond agriculture to diversify the choices open to rural dwellers.

*Key words: poverty alleviation, smallholder agriculture, commercialisation, output market participation, and smallholder wellbeing and welfare.*

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## ACRONYMS

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AgriBEE:	Agricultural Broad-Based Black Economic Empowerment
AgriSETA:	Agriculture Sector Education Training Authority
ANOVA:	Analysis of Variance
AsgiSA:	Accelerated and Shared Growth Initiative for South Africa
ATE:	Average Treatment Effect
ATT:	Average Treatment on the Treated
CASP:	Comprehensive Agricultural Support Programme
CIA:	Conditional Independent Assumption
CRE	Correlated Random Effects
DAFF:	Department of Agriculture, Forestry and Fisheries
DFID:	Department for International Development
DTI:	Department of Trade and Industry
ECC:	Employment Conditions Commission
ECSECC:	Eastern Cape Socio Economic Consultative Council
FAO:	Food and Agriculture Organization
GDP:	Gross Domestic Product
GVA:	Gross Value Added
IDASA:	Institute for Democratic Alternatives in South Africa
IES:	Income and Expenditures Survey
IFAD:	International Fund for Agricultural Development
IMT:	Irrigation Management Transfer
KBM:	Kernel-Based Matching
KWT:	King Williams Town
MAFISA:	Micro Agricultural Financial Institutions of South Africa
MPI:	Market Participation Index
NNM:	Nearest Neighbour Matching
OECD:	Organisation for Economic Co-operation and Development
OLS:	Ordinary Least Squares
PPP:	Per day Per Person
PSM:	Propensity Score Matching

RDP:	Reconstruction and Development Programme
SDGs:	Sustainable Development Goals
SLF:	Sustainable Livelihood Framework
SONA:	State of the Nation Address
SPSS:	Statistical Package for the Social Sciences
SSA:	Sub Saharan Africa
STATS SA:	Statistics South Africa
TFP:	Total Factor Productivity
WRC:	Water Research Commission



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# CHAPTER 1

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## INTRODUCTION

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### 1.1 Background and introduction to the study

South Africa ranks among the upper-middle-income countries with approximately \$13,500, that is R172412,56 of Gross domestic product (GDP) per capita (World Bank, 2018), yet the country is still facing challenges in many aspects. Although the country's economy has modernised and grown, the levels of poverty and deprivation are still very high compared to other middle-income countries in Southern Africa, like Botswana and Namibia. There is still high proportions of adult population (49.2 percent) in South Africa who live below the minimum acceptable standard of living (Stats SA, 2017). The macro-economic indicators also suggest the significant expansion of the economy that put South Africa at the very top on the African continent, yet the gross inequalities and frustration persist. Based on its inequality trends, South Africa is deemed the most unequal society (Baiyegunhi, 2008; World Bank, 2019), because the country's economy does not benefit everyone equally. The country's problem is exacerbated by the fact that the economy is not able to create a job enough to absorb the expanding labour force. This translated into unemployment reaching 28.48 percent in 2020, the highest that the country has ever seen since 1994 (Stats SA, 2020). Limited opportunities for employment also limits the prospects of most rural communities (Makal, 2014), where the majority are poor, to meet the basic human needs, create and maintain a better living. Hence, the continued service delivery protests that has rocked the country since 2006.

For over two decades, South Africa made all attempts responding to the call to fight poverty and unemployment, as well as bringing the rural areas into the sphere of the development. Taking a step forward, the South African government reviewed its development strategies, and it has successfully mainstreamed several programs aiming to mitigate poverty and all its roots (Kibirige, 2013). Agriculture is the primary sector

through which livelihoods of many poor communities are based. More specifically, small-scale farming can be instrumental in ensuring not only food sufficiency and food security but has also been confirmed that GDP growth originating from small-scale farming reduces poverty more effectively than GDP growth in other sectors (Abraham & Pingali, 2020; Hlophe-Ginindza & Mpandeli, 2020). Moreover, the sector employs over 50 percent of the working population in Africa. For example, more than 80 percent of the working age population in countries like in Burkina Faso, Burundi, and Madagascar, works in agriculture (Shimeles, Verdier-Chouchane & Boly, 2018).

South Africa's economy is however not agriculture-based. The sector's contribution to the country's GDP amounts to only 4 percent (Christian, 2017). However, despite its meagre contribution to the gross domestic product (GDP), agriculture's contribution to the wellbeing of South Africans should not be ignored simply because of the sector's little percentile contribution to GDP. According to Mujuru and Obi (2020), there is approximately 86 percent of the population in South Africa, who depend entirely on agriculture and agricultural related activities for their livelihoods. Either as farmers or as farmworkers, through their different strategies, the poor households seek to ensure that they are food self-sufficient while also generating the needed income to satisfy the immediate consumption needs and social purposes.

The country's 2030 Strategic Vision for the rural economy also gives strong attention and emphasis on the critical role that agriculture plays as a primary economic activity in rural areas (Denison, *et al.*, 2016). In line with this strategy, the initiatives of the Accelerated and Shared Growth Initiative for South Africa (AsgiSA) earmarked on activities that can contribute significantly to employment creation (World Bank, 2018) and support for smallholder production to increase incomes (The Presidency, 2008). Evidence from around the world also confirms that when provided with relevant and adequate support, to improve their production and productivity, smallholder farming is as efficient as larger farms (World Bank, 2007). However, if maintained at subsistence level, small-scale farming may not be sufficient to guarantee sustainable food security and welfare at household level (Gobena, 2016). The basis of the argument is that livelihoods require

much more than just food self-sufficiency but if life is to be comfortable, income is also needed to maintain life and satisfy both the economic and social needs. Meaning that smallholder ought to explore options that contribute to their household incomes (Merkeb & Nego, 2016; Melketo, Geta & Seiber, 2020). However, given the economic constraints and limited access to productive resources, the smallholders' options remain limited and agricultural production remain the principal activity in rural areas (Liu, Chen & Xie, 2018).

Recent studies have shown that the productivity of rural farmers in South African is quite low (Mujuru & Obi, 2020; Myeni, Moeletsi, Thavhana, Randela & Mokoena, 2019). This requires that smallholder farmers are capacitated, empowered and encouraged the smallholder farmers to adopt and apply new technologies, improved inputs and be able to identify and take advantage of the economic opportunities, to ensure sustainable livelihoods and food security. This implies that the smallholders' subsistence form of agriculture, needs to be replaced with something more economically viable (Taruvinga, 2011). Commercialisation of smallholder agriculture encourages the subsistence smallholder farming households to increase their share of agricultural production and improve their marketable surplus (Chirwa, Doward & Matita, 2011a; Nwafor, 2015). This is particularly important for smallholders because the increased marketed production can help create opportunities for farmers to generate extra incomes, which can be reinvested within to generate much more advancements in the rural economy (Arias, Hallam, Krivonos & Morrison, 2013; Gutu, 2016; Mudhara, 2010). Commercialisation enhances trade, efficiency, which in turn increases productivity, household incomes, and improvements in welfare outcomes and eventually bringing the farming households out of poverty (Carletto, Corral & Guelfi, 2017). Depending on their capabilities, smallholders therefore, use different strategies that help them take advantage of opportunities that come with commercialisation while also achieve their most sustainable livelihoods (Khatiwada, Deng, Paudel, Khatiwada, Zhang & Su, 2017).

In South Africa, commercialisation meant the integration of the resource-poor black small-scale farmers who are mostly located in the marginal former homelands areas into the mainstream economy (Ndlovu, 2013), as a viable strategy for poverty reduction, through

food sufficiency and job creation in these areas (Tapela, 2012). It simply means giving the small-scale farmers an opportunity to do the best they can to make better use of their talents within the confines of the former homelands (Aliber, 2019). In this process, the Department of Agriculture, Fisheries, and Forestry (DAFF) had a crucial role to play. Among its roles was to ensure that smallholder and subsistence farmers graduate to commercial level of agriculture products within their rural milieu.

Through DAFF, the South African government has promulgated numerous farmer's support programs (Southern African Trust and The Institute for Democratic Alternatives in South Africa (IDASA), 2011). These include among others, the Micro Agricultural Financial Institutions of South Africa (MAFISA) that was introduced in 2004 with the sole purpose of providing finance through credit to farmers. The MAFISA program aimed at providing financial support through of about R500 000.00 up to R 1 000 000 to beneficiaries of the land restitution, redistribution, and land tenure reform programs (Mafora, 2014). Along with the MAFISA, the Comprehensive Agricultural Support Programme (CASP) was launched (Mamabolo, 2017) to assist the emerging farmers, black farmers, in particular, to become successful agricultural entrepreneurs. In 2005, the cooperative model was also initiated and agricultural farmer co-operatives were registered and trained to ensure the commercial viability and links to financial services and businesses. During this period, the extension officers were also trained in providing mentorship to farmers (DAFF, 2016). However, since the commencement of these programs, the success in lowering the number of people living with poverty and achieving full commercialisation has been negligible. While the number of small-scale farmers decline year after year, the majority of South Africans have been reported to still live below the poverty line up to this day.

In the Eastern Cape Province, although the province had equally benefited from the implemented poverty reduction projects as the rest of the country's provinces, the sector still shows sluggish transition into a marketable surplus. The smallholders remain stuck to the same pattern of production that does not meet the market standard while their poverty conditions remain unresolved (Mujuru & Obi, 2020). Not only has poverty

remained rife but the province also record the highest unemployment rate (36.5 percent) (Eastern Cape Socio-Economic Consultative Council, ECSECC, 2019). Meaning that more than half of all people of working age in the Eastern Cape were unemployed in 2019. Hence, the increasing hardships, as real incomes fall in the face of rising inflation and low job growth (Ngumbela, Khalema & Nzimakwe, 2020). Consequently, smallholder production remain the means for guaranteeing the respective food security status but with minimal market orientation. This situation raises the question as to whether the policy has done little to encourage and support smallholders' farmers or what policy has not done in improving the economic welfare of smallholders.

## 1.2 Statement of the Problem

In South Africa, rural economic growth is assuming the centre stage intending to expand smallholders' agricultural practices (Naude, 2013). It became clear that prioritising agricultural transformation seems the fast drive to commercialisation and rural development. Commercialisation of smallholders was therefore initiated to expand small scale farming practices through which subsistence farming is accelerated, and the process of transition to a more market-oriented enterprise is heightened in view of addressing poverty and poverty-related issues (AgriSETA, 2010). However, while commercial farming is common among the white population, it has remained herculean for the subsistent black population despite the reforms associated with commercialisation. For black smallholder farmers, commercialisation has brought little or no improvements in their farming system, leaving them with low productivity and reduced incomes because all the food production satisfies the home consumption (Kibirige, 2013). The resultant effect of this is an outright denial of smallholder farmers' access to market and other economic (Obi, 2011; Fan, Brzeska, Keyzer, & Halsema, 2013).

Generally, smallholder farmers, especially in the former homelands, find it difficult to penetrate and enjoy the opportunities and benefits of the markets because they are geographically isolated. Among their challenges, farmers complain about long distances to markets and lack of good roads, which causes high transaction costs and considerably

hinders the market-oriented production (Mmbando, 2014). When farmers eventually participate in markets, grief has also been about their inability to meet the market standards, including their sustainability and inability to stand the competitive market (Mignounaa, Abdoulayea, Aleneb, Akinolaa & Manyong, 2015; Nwafor, 2015). Consequently, only about 200 000 to 250 000 smallholders are able to sell their farm produce (Sinyolo, 2016) and many fail to sell all their produce because of spoilage due to lack or poor storage facilities and lack of market access (Okunlola, Ngubane, Cousins & du Toit, 2016). Expectedly, the pace of smallholder transition into a market-oriented agricultural production remain slow and the process of commercialization has not translated into any significant positive change in the lives of the rural poor farmers (Khapayi & Celliers, 2016).

As literature suggests, the key to successful commercialization requires improving smallholder farmers' ability to participate effectively and meaningfully in agricultural output markets (Otekurin, 2019; Mmbando, 2014). The concept commercialisation of smallholder or emerging farmers as a strategy for rural economy improvements and reduction of poverty in the Eastern Cape is well documented, (Udoh & Omonona, 2008; Avulety, 2017; Kibirige, 2016; Khapayi and Celliers, 2016; Maponya, *et al.*, 2015; Jari, 2012; Mtero, 2012), to mention but a few. For a long time, this literature has mostly focused on identifying the challenges and constraints to commercialisation and market participation of smallholders, including their choice of marketing channels and impacts of technology adoption. However, farmers are not homogeneous; they differ in their characteristics, capabilities and their inclinations especially towards markets (Arias, *et al.*, 2013). Commercialization therefore, affects farmers differently depending on their socio-economic, policy and institutional environments, at different scales of production and their constraints to participation change because of market developments (Abdullah, Rabbi, Ahamad, Ali, Chandio, Ahmad, Ilyas, Din, 2019).

From literature, it is clear that the smallholders' market participation is low (Mdoda & Obi, 2019), however, there is dearth of information on how much progress the smallholders have made in penetrating the markets as agricultural transformation takes place as well

as the relationship between market participation and its immediate effects on welfare of farmers in the Eastern Cape. The level of commercialization can be indicated by the extent to which farmers engage in markets (Apind, 2015). Likewise, the factors that determine the extent of their participation vary significantly, as agricultural transformation takes place (Apind, 2015).

Market access and its constraints for small producers are not a new phenomenon, but the severity of poverty and inequality in South Africa (World Bank, 2018) makes it a pressing issue of concern for policy (Avuletey, 2017). The challenge for policymakers is to determine which factors to target and prioritize for which categories of smallholders since smallholders are not homogenous in their characteristics. This study attempted to fill this gap of knowledge and more specifically to uncover the level of market participation and the specific reasons for the sluggish progress in achieving commercialisation, including whether there are greater payoffs ensuring the improvements in the quality of life of the smallholder farmers. The findings will provide evidence for policy makers to help guide smallholders to direct their effort towards increased market participation as well as whether commercialisation of smallholder farming is worth the investments.

### **1.3 Study aim and objectives**

The overall aim of the study was to evaluate the market participation of smallholder farmers to determine its measurable impacts on welfare of smallholder households. To achieve this aim the following specific objectives were pursued:

- To determine the level of output market participation among the smallholder households,
- To identify the factors that affect the extent of smallholders' participation in output markets,
- To determine the impact of output market participation on the welfare of the smallholder households,
- To make recommendations for policy and strategies in implementing agricultural development programmes.

## 1.4 The research questions

The main question the study sought to address was how much progress the smallholder farmers have made in achieving commercialisation. The specific questions the study aimed to answer the following questions:

- To what extent are smallholder farmers participating in output markets?
- What are the factors affecting the intensity of the market participation of smallholders?
- Does market participation results in the significant improvements in the welfare of smallholder farmers?

## 1.5 Hypothesis

The following hypothesis of the study were tested;

1. There is no difference between smallholders in terms of the extent to which they participate in output markets.
2. Market participation does not have any impact on the welfare of smallholder households in the project area.

## 1.6 Significance of the study

South Africa continues to fight for equity by empowering those who were previously denied opportunities under the Apartheid era (Makhura, 2001). In the case of agriculture, the primary objective for policy has been to create an enabling environment with equal access to opportunities for all (Delpont, 2019; Randela, 2005). Since 1994, the government took considerable steps through the formulation of policy, implementation of various programs aimed at improving livelihoods, welfare, and status of the rural poor. This has been a critical process for both sustainable economic growth, poverty alleviation, and inequality. However, over in twenty-three years of democracy despite the transformation of the national legal and political framework, no measures taken have been commensurate with the circumstances of the previously disadvantaged rural

smallholders (Aliber & Hart, 2009). The rural economy does not provide the rural farmers with any worthwhile economic opportunities, hence small-scale producers in rural areas be still confronted by low incomes

Integrating the poor farming households into the mainstream economy can be a significant path for the development agenda but only if their plight is well understood. Considering the important role, the small-scale farming play in development, poverty reduction and food security, improvement of market access is crucial as a means for the sector's development. However, without a clear understanding of the different socioeconomic characteristics of smallholders, including their different categories, it is difficult to design and implement policy with appropriate interventions, with direct and greater payoffs (Pienaar & Traub, 2015).

This study contributes to the already existing body of literature by providing the empirical information on exactly how much progress the smallholders have made in the line of commercialisation. Since smallholders are not homogenous in their characteristics, using the market participation index as a measure of the smallholders' degree of market participation would reveal the dynamics at different levels in the process of commercialization. This will help determine whether the commercialisation barriers are the same at different levels of commercialisation or not. Distinguishing between such factors is necessary for evaluating strategies and programs designed to support smallholder development. It will also contribute to ensuring the improvements in the lives of the smallholder farmers and meeting the obligated goals of the Sustainable Development Goals (SDGs) of poverty alleviation and sustainable development.

Generally, the findings of this study would necessitate improvements in access to markets and measures for effective participation in output markets thereby unlocking credible and suitable opportunities for better incomes for smallholder farmers to transform their livelihoods. The findings will also will have important practical implications for policy regarding appropriate pathways for poverty alleviation and livelihoods improvements in the rural of the Eastern Cape Province.

## **1.7 Delimitations of the Study**

The study used the survey data collected from smallholder irrigators in Qamata, Zanyokwe and Tyefu irrigation schemes in the former homelands of the Eastern Cape Province in South Africa. In this study, the extent of output market participation and the impact on welfare of smallholder farmers were measured on the basis of farmers' recall rather than direct observation. It is possible that the accuracy of such information will be influenced by the extent to which farmers can recall historical information which will in turn be influenced by the length of time since the events took place. The results of this study and the conclusions drawn from the analysis are therefore to be received with an open mind. At the earliest opportunity, alternative procedures will be employed in extending these results in the on-going efforts to gain deeper understanding of the key issues in the agricultural transformation of South Africa's former homeland areas.



## **1.8 Ethical Considerations**

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In considerations with the university rules and regulations on conducting research on human objects, permission was obtained in the form of a clearance certificate from the University Research Ethics Committee. Permission was also obtained from the Agricultural Extension offices and local leaders before meeting the respondents in the respective communities. The key ethical considerations were in respect to the treatment of respondents and other research participants and how personal information was handled and the recognition of the importance of confidentiality.

## **1.9 Scope of the study**

The thesis is organized into eight chapters. Chapter 1 is an introductory chapter presenting a brief background of the study, problem statement, the outline of the aim and objectives to be achieved and the methodologies followed for analysis. Chapter 2 presents the theoretical underpinnings of market participation, commercialisation and the

role markets play in achieving both commercialisation and welfare improvements. In Chapter 3, the study presents an overview of poverty, the role smallholders play in poverty reduction and improvements in the wellbeing of smallholder farmers. Chapter 4 contains methods and procedures for site selection and tools for model estimations. In Chapter 5, the socio-economic characteristics of farmers with respect to market participation and farmers' welfare are presented and discussed. Chapter 6 presents results and discussion of the determinants of the smallholder's market decision and degree of market participation. Chapter 7 presents the findings on the welfare outcomes of the smallholder farmers because of market participation. Chapter 8 summarises the study, provides conclusions and makes recommendations for policy and future research.



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## CHAPTER 2

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# MARKET PARTICIPATION AND COMMERCIALISATION OF SMALLHOLDERS

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### 2.1 Introduction

Agricultural transformation has been a topic of interest for development and poverty alleviation. This is mainly because agricultural productivity can create a significant boost on the income of the smallholder farmers (Camara, 2017). There is, therefore, a need to understand the decision-making behaviour of smallholders, how they respond to different conditions and especially, their choices between home production and income generating activities. The present chapter provides a comprehensive review of the theoretical underpinnings of peasant household behaviour. Three theories namely; profit maximization, utility maximization, the farm household or agricultural household and bounded rationality models are explored. The chapter also presents review of literature in respect to the two main themes of the study namely; Commercialisation as a process of development of smallholder farming and the role markets play in achieving commercialization. The chapter concludes with a summary of the insights gained from the reviewed literature.

### 2.2 The Standard Household Production Theories

In most developing countries, rural households derive the most part of their livelihood from their production and most often, they consume a part of what they produce (Pilo, 2019). That is, a household is a decision-maker for both production and consumption. Three alternative economic theories (profit maximisation, utility maximisation, and farm household theory) of peasant behaviour are presented in this section. Each theory presupposes that a peasant aim to maximize their choices, within a set of constraints. This means they make choices according to the options available to them. The household will then choose the most preferred option according to some consistent criterion. The section also present the

bounded rationality theory to affirm the difficulty a farmer encounters in their decision-making given the uncertainties and complexities of the real world.

### 2.2.1 The Profit Maximisation theory

The peasant production model assumes that the producer's goal is to maximize profit. Despite resource scarcity, poor households allocate their resources efficiently (Schultz, 1964). Hence, the "poor but efficient" hypothesis by Schultz (1964), which is explicitly based on allocative efficiency, and implicitly on technical efficiency. Schultz then defined efficiency as a condition

*“where producers all apply the same prices, workers are paid according to the value of their marginal product, inefficient firms go out of business, and entrepreneurs display non-diminishing marginal utility of money income”* (Mendola, 2007).



Farm profits are given by the following expression:

$$\pi = pQ - wH - vV \tag{2.1}$$

Where ( $\pi$ ) is the farm profits,  $p, w,$  and  $v$  are prices of farm produce, labour, and other variable inputs.  $Q$  is the output of farm produce,  $H$  is the total labour input and  $V$  is the quantity of other variable inputs. The profit that the farm makes ( $\pi$ ) is equal to the revenue it makes from selling its product ( $pQ$ ) minus the amount that they have to spend on purchasing all the inputs. However, the farm's problem is to make choices between available options and decide on the best combination of inputs with the lowest cost of production while maximize production (Stober, 1969), or maximizing the output subject to cost constraint (Toulon, 2013). The farm's profit maximization problem is:

$$\underset{H,V}{Max} pf(H,V) - wH - vV \tag{2.2}$$

To solve the profit maximization problem in the face of the cost constraints, the farming household chooses the optimal cost of inputs so that profit maximization function  $\pi(\cdot)$  is:

$$\pi(H, V) = \max pQ - wH - vV \quad (2.3)$$

Where the profit function is equal to the production revenue minus the production input costs and profit is maximized if the accumulated profits are greater than all the costs. This expression implies that a peasant's only motive for production is profit maximisation (Thapa, 2005). This ideology has received a lot of criticisms from scholars, the argument is that it overlooks the fact that peasant households are consumers of their own produce, as a result consumption decision in peasant household cannot be ignored (Mendola, 2007).

According to Juma (2013), peasant households make many tradeoffs between profits and other equally important household goals. For example, peasants produce and consume part of their produce, therefore, their primary motive for production is to ensure survival through food sufficiency and only the surplus can be marketed. This means that the assumption of pure profit maximisation does not hold where households produce and consume a portion of their output. This shortcoming has led to the development of the utility maximisation theory, which recognizes the dualistic nature of rural household's behaviour as both a producer and consumer of their produce (Mendola, 2007).

### **2.2.2 Utility Maximization Theory**

One of the earliest models of utility maximisation was the Chayanovian model developed by Chayanov (1925). Chayanov understood that the behaviour of the farming household could be better explained in a household-firm framework, because of its characteristic nature of being a producer and consumer of its own produce. As producers and consumers, households ultimately own and allocate their resources efficiently and effectively to produce an output from which they consume to maximize their utility and/or sell to receive monetary payments in return. The model assumes that as a consumer, a farming household will

pursue the utility maximizing options (Mendola, 20017; Goodwin, Nelson, & Harris, 2008). The farm household utility maximization function can be given as:

$$U = U(X_c, X_m, X_l) \quad (2.4)$$

Where  $X_c$  represents agricultural staple,  $X_m$  is market purchased good and  $X_l$  is for leisure.  $U$  is the utility function and because markets are not completely perfect, farmers are subject to the following constraints:

$$P_m X_m = P_c(Q_c - X_c) - P_l(L - F) - P_v V + E \quad \text{Income constraint} \quad (2.5)$$

$$X_l + F = T \quad \text{Time constraint} \quad (2.6)$$

$$Q_s = Q(L, V, A, K) \quad \text{Production constraint} \quad (2.7)$$

Where,  $P_m$  is the price of purchased good,  $P_c$  is the staple price,  $Q_c$  represents the production of the staple good,  $Q_c - X_c$  represents the marketed surplus of staple,  $P_l$  is the wage rate for labour provision,  $L$  is the total labour input,  $F$  is family labour input,  $L - F$  is the net labour (sold or bought),  $V$  is a variable input,  $P_v$  is the price of the variable input and  $E$  is for non-labour and nonfarm income. The good example of non-farm or non-labour income can be remittances, which increases as the family gets more, but can adversely be affected by payments such as taxes.  $T$  represents the households' total time. In the third constraint is the production function, where  $A$  is the quantity of household land and  $K$  is its stock of capital.

The above constraints can then be collapsed into a single constraint equation by substituting the production constraint into the income constraint, and the equation is represented as;

$$P_m X_m + P_c X_c - P_l X_l = P_l T + \pi + E6 \quad (2.8)$$

Where  $P_m X_m$  is household expenditure on market good.  $P_c X_c$  represents, purchase from its own produce and  $P_l X_l$  is the time spend on leisure (non-production activities). Equation (3.9) is a measure of farm profit

$$\pi = P_d Q_d(L, V, A, K) - P_l L - P_v V \quad (2.9)$$

Where the equation (2.9) shows that the total household expenditure is equal the full income. Then the maximising of household utility is subject to the single constraint yields the following first order condition (Sinyolo, 2016):

$$P_c \frac{\partial Q}{\partial L} = P_l \quad (2.10a)$$

$$P_c \frac{\partial Q}{\partial V} = P_v \quad (2.10b)$$

$$\frac{\partial U}{\partial X_c} / \frac{\partial U}{\partial X_m} = \frac{P_c}{P_m} \quad (2.11a)$$



Equation (2.10a) and (2.10b) show that the household will equate the marginal revenue products for labour and other input to their respective market prices. These equations (2.10a) and (2.10b) represents the standard conditions for profit maximisation.

$$\frac{\partial U}{\partial X_l} / \frac{\partial U}{\partial X_m} = \frac{P_l}{P_m} \quad (2.11b)$$

When the second order conditions are met, only  $L$  and  $V$  appear as endogenous variables and the other endogenous variables,  $X_m$ ,  $X_c$ ,  $X_l$ , do not appear, therefore, have no influence on the household's choice of  $L$  or  $V$ . Farm labour and demand for other inputs can be determined as a function of prices ( $p_c$ ,  $p_l$ , and  $p_v$ ), the technology parameters of the production function, and the fixed area of land and quantity of capital.

The maximised values of profits, which is equations (2.10a) and (2.10b), can be substituted into the utility maximization equation (2.4), the combination of (2.10a) and (2.10b) into the utility maximizing equation yields:

$$P_m X_m + P_c X_c - P_l X_l = Y^* \quad (2.12)$$

Where  $Y^*$  is the value of full income associated with profit-maximizing behaviour. Equations (2.11a), (2.11b) and (2.12) can be regarded as second maximizations. The household having maximized profits, equation (2.10a) and (2.10b), can then maximize utility depending on the maximized value of full income, equation (2.12). In other words, peasant households can only satisfy their utility after achieving their full income. According to this theory, the peasant farmer's production motive is to first generate the income, which they would then spend on their demands for example; demand for consumption goods and leisure.

Likewise, the utility maximization theory also has shortcomings in fully explaining peasant economic dynamics. Like the profit-maximizing theory, the uncertainties involved in peasant production are completely ignored especially when all the assumptions are based on perfect competition and participants' full knowledge of the information in the market. The peasants' market environment is often associated with imperfections where the markets fail to produce and supply at certain times of year or in certain localities (Mendola, 2007). Therefore, a peasant farmer would instead produce for home consumption and only when the home consumption is satisfied, the surplus is taken to the market. This shortcoming led to the introduction of the agricultural household production theory/model.

### **2.2.3 Agricultural household model**

The agricultural household models originates from the unitary household model developed by Becker's (1981). The unitary household model assumes that a household acts as a single production and consumption decision-making unit (McGroger, *et al.*, 2001), which maximizes the utility of the entire household subject to various household level constraints on production, income and time (McGroger, *et al.*, 2001; Rola-Rubzen & Hardaker, 1999). In that same view, agricultural household model recognizes that production and consumption decisions are linked as the deciding entity (Kuroda & Yotopoulos, 1978) who is a rural household, is both a producer and a consumer of its produce under both perfect

and imperfect markets. The model assumes that the producing household consumes its farm output and the surplus is marketed. The model incorporates the notion of full household income (Becker 1965). The household's main objective is to maximize expected utility through consuming home-produced and market-purchased goods, and leisure time, subject to full income constraint (Becker, 1965). The full income constraints include cash income equation, family time and endowments of fixed productive assets, and production technologies (Taylor, 2002).

$$P_m X_m = P_c(Q_c - X_c) - P_l(L - F) - P_v V + E \quad \text{Income constraint} \quad (2.13)$$

$$X_i + F = T \quad \text{Time constraint} \quad (2.14)$$

$$Q_s = Q(L, V, A, K) \quad \text{Production constraint} \quad (2.15)$$

The cash income constraints indicated that households could only spend their income on the consumption and production within their means. That is, their expenditures is limited by their revenue levels and transfers (Ouma, jagwe, Obare & Abele, 2010).



Given their dual role as producer and consumer, smallholders find it difficult to make the best choice as to whether to consume their own-produce, meaning that, a farmer is practically buying from himself. Alternatively, a farmer may decide to produce to sell their output and later consume the market-purchased goods. Likewise, not only is income a determining factor but the time allocated to household production activities, is implicitly valued with the corresponding market wage (Asfaw, Mithöfer, & Waibel, 2007; Wickramasinghe *et al.*, 2014).

In this regard, production and consumption decisions would be taken independently of each other (separable). The separability of the model implies that the household's production decisions are not affected by its consumption and labour supply decisions (Findeis, Swaminathan & Jayaraman, 2003). This is because prices would be determined exogenously, therefore, time spent on leisure and production becomes independent. The allocation of household labour would be determined by the going market wage, while household consumption and production is determined by the household full income

(Juma, 2013). Sequentially, the profit maximization decision is made in the first stage, equation (3.12). Once the profit is determined, the consumption problem is resolved in the second stage (Findeis, *et al.*, 2003). Given the results of the first stage, a household can determine whether to their demand for Leisure or for other commodities (Findeis, *et al.*, 2003).

For many rural households in the developing countries, including South Africa, where agriculture is the primary source of livelihoods, their reality is that markets hardly work perfectly (Findeis, *et al.*, 2013). A common experience for farmers in developing economies is that their market participation is often associated with the highly overwhelming production and transportation cost, including risks associated with uncertain prices. In other cases, farmers cannot meet the market standards and the required quantities of supplies (de Janvry, Fafchamps & Sadoulet, 1991). As a result, farmers fail to participate effectively.

Moreover, the dual characteristic nature of being producers and consumers further demonstrates that as long as market imperfections and constraints exists, the household continues to be indifferent between consumption of own produced and market purchased goods (Wickramasinghe *et al.*, 2014). So, the assumption of separability of the farm household model does not hold.

Households simultaneously make production (the level of output (Pilo, 2019), use of inputs, choice of activities, and the choice of technology) and consumption decisions (labour supply and demand factors) (Taylor, 2002). This means that the two decisions are determined/estimated jointly and simultaneously. This happens because the household's decision regarding production is affected by its consumer characteristics such as consumption preferences, demographic composition (de Janvry, Fafchamps, & Sadoulet, 1991) and so on. For example, the consumption of their produce will have an impact on the level of income, likewise the level of income is likely to have influence on their consumption levels (Juma, 2013; Findeis, *et al.*, 2003).

### 2.2.3.1 The theoretical framework

Following on Singh *et al.* (1986) agricultural household model, the household is assumed to maximise utility,  $U$ , by consuming a vector of agricultural commodities,  $X_c$ , manufactured goods,  $X_m$ , and home time or leisure,  $X_l$ . The utility function as expressed in equation (3.4). The utility function is conditioned by a set of household characteristic subject to a set of constraints  $Z^c$ . The household faces a set of constraints; e.g. Cash income constraint, thus:

$$\sum_{i=1}^N [(p_i - t_i^s(Z_t^s))\zeta_i^s + (p_i + t_i^b(Z_t^b)\zeta_i^b] m_i - t_{fi}^s(Z_t^s)\zeta_i^s - t_{fi}^b(Z_t^b)\zeta_i^b + E = 0 \quad (2.16)$$

Where:  $p_i$  is the market price of good  $i$ ; the vector  $m_i$  represents farmer's choice of whether to participate in the market or not, as a seller  $\zeta_i^s$  or buyer  $\zeta_i^b$ .  $\zeta_i^s$  takes the value 1 for every crop the farmer decides to sell and zero, otherwise. Similarly, the vector  $\zeta_i^b$  takes value 1 for every crop the farmer decides to buy and  $\zeta_i^b =$  zero for crops not bought. The net sales are positive if and only if there is a sale of good  $i$  and negative if and only if there is a purchase.  $Z_t^s$  and  $Z_t^b$  are exogenous characteristics that affect the variable transactions when selling ( $t_{vi}^s$ ) and buying ( $t_{vi}^b$ ) respectively. The cash income constraints state that expenditures on all purchases cannot exceed revenues from all sales and transfers (Ouma, *et al.*, 2010).

Given the variable transaction costs, buyers are willing to buy when prices are low. As a result, the seller receives the lower price than the market price  $p_i$ , by the unobservable amount,  $t_{vi}^s$ . The price paid by the buyer is greater than  $p_i$ , by the observable amount  $t_{vi}^b$ ;  $t_{fi}^s$  and  $t_{fi}^b$ , and these are the unobservable fixed transaction costs when selling and buying respectively and are a function of the observable exogenous factors  $Z_t^s$  and  $Z_t^b$  that can explain these costs; and  $E$  is exogenous transfers and other incomes (Ouma, *et al.*, 2010). The production technology constraint is given by:

$$G(Q_i, X_i, Z^p, M, \Omega) \quad (2.17)$$

where  $Y_i$  is amount of output  $i$  produced from the farm,  $X_i$  represents both purchased and non-purchased inputs used in the production process of good  $i$ . Vector  $Z^p$ , represents household characteristics affecting production decisions,  $M$  is a vector of fixed factors such as land, and  $\Omega$  is a vector of fixed effects of location, such as population density and market access.

The household also faces a resource balance constraint presented as:

$$Y_i - X_i + A_i - m_i - C_i = 0 \quad (2.18)$$

where  $A_i$  is the endowment of good  $i$ . The resource balance equation in (2.4) states that the amount consumed,  $C_i$ , used as input,  $X_i$  and sold, ( $m_i > 0$ ) is equal to what is produced,  $Y_i$  and bought plus the endowment,  $A_i$  of the good. Since output ( $Y_i$ ), inputs ( $X_i$ ) or consumption ( $C_i$ ) of a good  $i$  may be zero in a given production cycle but not less than zero, a non-negativity constraint is imposed (Ouma, *et al.*, 2010);

$$C_i, Y_i, X_i \geq 0 \quad (2.19)$$

Farmer's problem is to make choices that maximizes their utility/welfare given the fixed and variable transactions costs. This can be restated as;

$$L = U(C, Z) + \sum_{i=1}^N \eta_i (Y_i - X_i + A_i - m_i - C_i) + \psi \left( G(Y_i, X_i, Z^p, M, \Omega) \right) + \lambda \left[ \sum_{i=1}^N [(p_i - t_{vi}^s) \zeta_i^s + (p_i + t_{vi}^b) \zeta_i^b] m_i - t_{fi}^s \zeta_i^s - t_{fi}^b \zeta_i^b + E \right] \quad (2.20)$$

where  $\eta_i$ ,  $\psi$ , and  $\lambda$  are the Lagrangian multipliers associated with the resource balance, technology constraint on-farm production and cash constraint respectively. For the highest and best possible solution to be achieved, equation 2.20 is decomposed into two steps; first deciding on the best possible solution based on market participation, that is deciding whether to participate or not; secondly choosing the market participation that

yields the highest level of utility (Ouma, *et al.*, 2010). The first step involves maximization of the Lagrangian function for consumption goods  $C_i$ , outputs  $Y_i$ , inputs  $X_i$  and the marketed goods  $m_i$ , yielding the following first-order conditions (Ouma, *et al.*, 2010);

$$\frac{dU}{dc_i} - \eta_i = 0 \quad (2.21)$$

$$\eta_i + \psi \frac{dG}{dY_i} = 0 \quad (2.22)$$

$$- \eta_i + \psi \frac{dG}{dX_i} = 0 \quad (2.23)$$

$$- \eta_i + \lambda [(p_i - t_{vi}^s)\zeta_i^s + (p_i + t_{vi}^b)\zeta_i^b] = 0 \quad i \in \{i|m \neq 0\} \quad (2.24)$$

Based on equation 2.21, the market participation price can then be defined as;

$$\begin{aligned} p_i &= p_i - t_{vi}^s \quad \text{if } m_i > 0 && \text{Seller} \\ p_i &= p_i - t_{vi}^b \quad \text{if } m_i < 0 && \text{Buyer} \\ p_i &= \hat{p}_i = \eta_i/\lambda \quad \text{if self-sufficient/autarkic} && \end{aligned} \quad (2.25)$$



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When good  $i$  is marketed, the decision price includes the variable transactions costs,  $t_{vi}^s$  or  $t_{vi}^b$ . However, when the good is not marketed, the decision price is not market determined (an unobservable internal shadow price),  $\eta_i/\lambda$ . The market participation decision is then based on the expected utilities, whether the transaction costs are fixed or variable, a household chooses the combinations associated with the highest utility. The utility levels to be compared based on the following functions (Ouma, *et al.*, 2010);

$$\begin{aligned} V^s &= V_i(p_i - t_{vi}^s, y_0(p_i - t_{vi}^s) - t_{fi}^s, Z^c) && \text{if seller} \\ V^b &= V_i(p_i - t_{vi}^b, y_0(p_i - t_{vi}^b) - t_{fi}^b, Z^c) && \text{if buyer} \\ V^a &= V_i(\hat{p}_i, y_0(\hat{p}_i), Z^c) && \text{if autarkic} \end{aligned} \quad (2.26)$$

Where  $y_0$  is the household income at the decision price  $p$  of good  $i$  before incurring the fixed transactions cost,  $t_{fi}$ . The optimal market participation for a household is to buy when the market prices are below  $p_i - t_{vi}^b$ , be autarkic when  $p_i - t_{vi}^b < p_i < p_i + t_{vi}^s$  and

sell when market prices are below  $p_i + t_{vi}^s$ . An increase in the fixed transaction costs directly lowers household income and utility.

The corresponding supply function for good  $i$  with transactions costs can be presented as;

$$\begin{aligned}
 q_i^s &= q(p_i + t_{vi}^s, Z^p, M, \Omega) && \text{for sellers} \\
 q_i^b &= q(p_i - t_{vi}^s, Z^p, M, \Omega) && \text{for buyers} \\
 q^a &= q(\hat{p}_i, Z^p, M, \Omega) && \text{autarkic households}
 \end{aligned}
 \tag{2.27}$$

According to this equation 2.27, the transaction costs have no impact on the supply curve. Rather, it has an impact on market participation. Once the market participation decision is made, the farming household is concerned about the returns to production. However, depending on whether they are sellers or buyers, when the transaction costs are fixed, a seller would decide to postpone market participation until the prices are sufficiently higher. Thus, the law of supply. Likewise, a seller will delay their purchases until the prices are satisfactorily lower. That is the law of demand (Ouma, *et al.*, 2010).

#### 2.2.4 Summary of theoretical literature review

From the review of the theories in the foregoing, there is a clear difference among the agricultural household model, a pure profit maximization model and a pure consumer model. This is indicated in the fact that the smallholder farm households in the rural areas of the developing countries' produce and consume their produce and only when the home consumption is satisfied will surplus be marketed.

As literature has indicated, the experience across the African region, including South Africa, is that farmer's particularly those in the rural areas depend largely on agriculture for their livelihoods (Adebayo, Bolarin, Oyewale, & Kehinde, 2018), so the production of crops is either subsistence or semi-subsistence. This is because the households face either missing or highly imperfect markets or even a mix of both. Individuals therefore, have to make reach

a compromise between subsistence and purely economic considerations (Taylor, 2002). Generally, the production motive is to first satisfy the home consumption and the surplus may be marketed. This demonstrates that as long as market imperfections and constraints exist, farming households are indifferent between whether to focus on production for home consumption or produce for the market (Ntakyo, 2018; Gebre-AB, 2006). This further demonstrates that farming households are not purely utility or profit maximizers but a mix of both (Wickramasinghe *et al.*, 2014).

In that view, so long as the marketable surplus occurs as a residual outcome, farmers' decision-making behaviour does not distinguish between production and consumption (Gebre-AB, 2006). Hence, the reality is that we have non-separable production and consumption decisions. Wherever the decisions are non-separable, the dominant objective of the household is to maximize utility, while it maximizes profit where the decisions are completely separable.



These theories assume an idealized situation in which farmers are capable of making rational decisions and able to use all the information they can get to choose the optimal outcome, which allow them to clearly express their goals from the beginning and know all their consequences (Robert, Thomas & Bergez, 2016). However, in reality, individuals struggle to be rational because information is not always available to them and there is only a few alternatives to choose from (Hernandez, & Ortega, 2019). Even in simplest problems, optimality cannot be achieved because not being well informed makes it difficult to for individuals to explore and verify their options. Their specific environment may also have influence in their preferences and the opportunities they are exposed to, which means they may not even be aware of opportunities available to them. It therefore, means they cannot be completely rational in their decision-making. This situation can be best described by the bounded rationality theory of the Nobel Laureate Herbert Simon (1955).

### 2.2.5 Bounded Rationality Theory

Herbert Simon's (1950) view of the decision-making process is that given the amount of information available, decision-makers rather look for the satisfying decision than the best decision (Robert, 2016). According to Simon, the best decision is not always attainable because it is "bounded" by the lack of knowledge and/or information. Simon then coined the term 'bounded rationality', realizing that in their decision-making process, humans are often constrained by limited time, information and resources (Waldman, *et al.*, 2020). This means that the individuals' ability to make rational decision is restricted by their ability to gather data and understand them given the amount of time they have to make a decision. Farmers then search through the available options until they find one that help them obtain a suitable decision depending on their interests and aspirations. That is satisficing, rather than utility maximizing (Wheeler, 2020).

The individual values and their level of understanding also bound rational decision-making. However, these are mostly shaped by their environmental experience (Hernández & Ortega, 2019), which can potentially limit their capacity to choose the best option. This means that the possibility of committing errors in such decisions is unavoidable (Waldman, *et al.*, 2020). Several other studies such as Levin and Milgrom (2004) and McFadden (1986), have confirmed that with the little information individuals have, they employ strategies that use little information but allow them to make 'good' choices. For example, farmers assess an option they are familiar with or that surpasses a simple threshold of acceptability (Waldman, *et al.*, 2020). Similarly, when farmers have to make decisions under limited time, their past-experience and knowledge (intuition) plays an important role or they use the thoughts that immediately come to mind (rules of thumb). Farmers' intuition builds up over time with the experiences and greater knowledge, therefore, the more experience they have, the better their intuition. Rules of thumb on the other hand allows decisions to be made without extensive analysis, they are more easily learnt, taught and transferred whereas intuition is not, and are as basic as farmers approximating how much of their expected yield they should sell (Nicholson, 1995).

Commercialisation is associated with uncertainties and risk is embedded in uncertainty. Thus, whatever decision is made when uncertainty exists is said to be risky (Backus, Eidman & Dijkhuizen, 1997). Then operating within risky and uncertain environment with market-related dynamics and information asymmetries affect farmers' ability to make decisions (Johnston, Tether, Tomlinson, 2015). For example farmers face high cost of finding market information and knowledge about the different agents in the market and the less informed they are about the market dynamics (Johnston, et al., 2015), the more uncertain the farmers are, the more risk averse they are and the less likely they would participate in the market (Makhura, 2001).

Generally, the theory of bounded rationality suggests that farmers' capacity to make rational decision is limited because over and above being resource poor, rural farmers also lack information. That notwithstanding, farmers can work with the little information they have and still make satisfying participation decision. The crucial point is that information is not always available in abundance, so how they process and interpret such information within a limited time is dependent on their cognitive level. Farmer's cognitive level is also mostly influenced by farmers' personal and household characteristics, livelihood resources, their environment, institutions and policy information, to mention a few (Sun, Zhang & Zhang, 2018).

### **2.3 Smallholder market participation**

Access to markets acts as a medium of exchange that guarantees profitability to derive a meaningful livelihood and income for smallholders (Makhura, 2001; Thindisa, 2014). However, such success requires a suitable and enabling environment for smallholders to obtain such factors as market information, market intelligence, and effective farmer organization as critical for farmer's needs (Ngqangweni, Mmbengwa, Myeki, Sotsha & Khoza, 2016). Different scholars define market participation in so many different ways. Von Braun *et al.* (1991), Chapoto, Haggblade, Hichaambwa, Kabwe, Longabaugh, Sitko, and Tschirley (2012) describe market participation as an exchange or economic transaction

between or among individuals or households either in cash or kind. Goetz (1992) on the other hand, defines market participation as entailing household purchases and sales. From this perspective, volumes of produce transacted are used to assess market participation.

In the exchange of agricultural produce, market participation is closely related with output surplus (Mmbando, 2014) and this occurs when farmers stop being home production focused but become profit or market-oriented (Mignounaa, *et al.*, 2015). As Pingali and Rosegrant (1995) see it, market participation means that smallholders farmers are moving away from the traditional subsistence farming system to engage in production that is destined for the market, using improved technologies which allow households to produce the crops they have a comparative advantage on (Wieser, 2011). Obi *et al.* (2012) stressed the need for access to market for small-scale farmers, emphasizing that it is only through markets that smallholder producers can be effectively integrated into the mainstream economy, as either producers or workers particularly in the developing countries. Similarly, to encourage a meaningful participation of smallholders in markets, adequate access to production technologies and infrastructure is non-negotiable (Obi *et al.*, 2012).



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For rural smallholders, market participation begins from the farm when they make decisions on how to distribute their produce, what channels to use, and the specific activities such as product assembling, transportation, pricing, to mention a few, to meet the demands and requirements of the market (Hlongwane, Ledwaba, & Belete, 2014). However, because smallholders are resource poor (Mujuru & Obi, 2020; Mdoda & Obi, 2019; Khapayi and Celliers, 2016 and Maponya, *et al.*, 2015; Baiphethi & Jacobs, 2009) they face different market challenges, which affect their capabilities and their participation desires (Aris, Hallam, Krivonos & Morrison, 2013). The next section summarises the constraints or challenges the smallholders face in agricultural markets.

### **2.3.1 Market participation of smallholders in South Africa: Literature review**

Not much work has been done in South Africa on market participation of smallholder, especially on crop markets. Concisely this has generally been due to the negligent

behaviour of the system simply because of the perceived minimal contribution smallholder agriculture to the South African economy. The dominant research coverage across the country has extensively been on smallholder livestock and poultry farming. For example, the work of Ndoro, Mudhara, and Chimonyo (2014) in Okhahlamba Local Municipality in KwaZulu-Natal. Bahta and Bauer (2007) covered the five districts of Free State province, Ncube (2014) in Gauteng, Montshwe (2006) in Hammanskraal, Ganyesa and Sterkspruit, Mazibuko (2013), Ntshephe (2011) and Montshwe (2006) in North West to mention just a few.

These studies have employed techniques from a double hurdle model, Binary logistic regression model, and probit regression model to case studies to investigate and determine the factors and constraints of small-scale farmers in markets. The similarities in the findings of these studies are that distance to market, extension visit, market information, guidance, and training are the most significant factors affecting farmer's decision to sell either their livestock or poultry. The studies in particular Ndoro *et al.*, (2014), opined that the poor participation of the smallholders cannot only be attributed to lack of resource, rather by the difference in their access in finance, as well as their livelihood strategies. Ndoro *et al.*, (2014) is of the opinion that if farmers are capacitated with relevant skills including the technical skills and have access to the necessary information, asset constraints are likely to be minimised, then significant improvements can be manifested in farmers' potential.

In the crop and vegetable market, Senyolo, Chaminuka, Makhura, and Belete (2007) attest that despite the favourable policies in South Africa, the emerging farmers' ability to enter mainstream commercial agriculture is limited. Across the country, Senyolo *et al.*, (2007) observed that family, friends, and a few public stores closed to the farming communities remained the main market for the emerging farmers. The highlight though is that farmers face high transaction cost because farmers use deteriorated gravel roads due to bad weather conditions. For the fact that output market access has the potential to stimulate agricultural and rural development, Senyolo *et al.*, (2007) emphasize the

need for improving the road infrastructure and transport services in rural areas so that accessibility of both local and external markets is made easier (Senyolo *et al.*, 2007).

Bahta (2010) conducted a study in the Free State, which established that the transaction costs have a critical role in either encouraging or discouraging participation in the market by the smallholders, which mirrors the level of commercialisation. Using the Tobit regression model, the study revealed that the farming households who have access to information, production and liquid assets are more likely to faceless transaction costs, hence increased access to markets.

In the Northern Cape, smallholder farmers also face high transaction costs, which most often they are not even aware of (hidden cost) due to lack of information (Makhura, 2001). For example, the cost of finding a partner to trade with, which involves identifying the potential partner to screening and eventually, getting the product to its final destination. Then if market information is available to farmers including contact with the extension service, and these such and similar costs are identified, it could counteract market constraints, enhance and encourage participation among the small-scale farmers (Makhura, 2001).

Mthembu (2008) in KwaZulu-Natal acknowledged the government efforts in dealing with discriminative laws that excluded the smallholders from enjoying the market opportunities. However, the author noted that such efforts, for example, the IDPs through municipalities have failed to implement most of the intended projects and programmes, such as improving roads, provision of electricity and marketing services. As a result, farmers' predicaments remain unaddressed since they still cannot access the markets. Mthembu (2008) revealed that in rural KwaZulu-Natal, farmers have not experienced agricultural reforms, and the lack of service delivery and infrastructure has led to numerous market barriers such as;

- Lack of information pertaining market place, pricing strategies, crop management and handling,
- Non-existence of marketing and training skills,

- Farmers' inability to reach potential buyers as a result of bad roads,
- Absence of storage facilities,
- Inability to retain quality and add value to products,
- Absence of information sharing services,
- Lack of adoption of irrigation technologies,
- Absence of credit and credit service
- Lack of ownership of transport,
- Poor access to productive land for expanding productivity.

Likewise, smallholders are geographically not well located and this has made it difficult for them to reach the markets regardless of the type of marketing channels they use (Mthembu, 2008). Mthembu (2008) advised that appropriate infrastructure services like credit to finance agricultural inputs need be put in place if production and marketing, is to be enhanced. Otherwise, all efforts to integrate the smallholder farmers into commercial agriculture are nullified.



On the same note, Maponya, Venter, Van Den Heever and Mahlangu (2016) found that the smallholder's market participation decision in the Zululand district is affected mainly by among the factors such as land acquisition and size, water source, production inputs, type of crops planted, agricultural training and most importantly farming as a fulltime activity.

In Limpopo, Hlongwane, Ledwaba, and Belete (2014) analysed the factors affecting the participation of small-scale maize farmers in markets in the Great Giyani Municipality. The Logistic regression was employed for the analysis of data. The findings of this study corroborate with other similar studies that when farmers have access to credit and they are well informed in terms of market opportunities, they are mostly likely to participate in markets. However, the longest distance to market hinders the farmers' market activities. This study emphasized that although small-scale farmers are found to be efficient, they still find it difficult to access land and they lack the technical and market opportunities and

so they increasingly find it difficult to penetrate the market, which then renders them poor. The authors then recommended a review of the process of allocating land to farmers.

Chikazunga and Paradza (2012) conducted a case study studying and analysing the market participation of the smallholders in the Limpopo Province. Chikazunga and Paradza (2012) interest was to establish whether market participation could be considered a remedy to poverty alleviation. Through their discussions with participating farmers, they found that the farmers participated in both formal (e.g. supermarkets and agro-processors) and informal markets. However, farmers were most likely to participate in the informal markets than the formal markets because according to the farmers, the informal markets give relatively higher returns than formal markets. Based on the margins analysis, local channels (hawkers and roadside markets) allows farmers to realize greater margins compared than those offered by supermarkets. They revealed the formal channels have a reputation of dictating price and often, they offer lower prices as compared to prices farmers themselves would offer their produce for on the streets. The authors then recommend support for smallholders on their use of local markets as opposed to integrating them into the mainstream formal economy.



Ramoroka (2012) attested to Chikazunga and Paradza (2012) findings that the informal sector in Polokwane offers a larger market share and only a few sell their produce to major markets. On exploring what would make smallholders participate and exploit the formal markets, the Heckman selection model was used. The model revealed that like other areas in South Africa, the transportation of fresh produce to the distant formal market affects the value of the produce (vegetables). That is, the furthest is the market, the more costly it becomes. Likewise, the furthest the produce has to be transported, the more the impact on the quality and the value of the vegetables. Ramoroka (2012) suggested that farmers needed to be capacitated through the depot establishments to bring markets closer to the farmers and deployment of specialist extension agents as well as encouraging the formation of farmer groups or organizations.

Baloyi (2010) on the other hand used a Logistic regression model to examine the constraints the emerging farmers are faced with in Limpopo. The results in this study validate the findings in the previous work of Chikazunga and Paradza (2012). Baloyi (2010) had also found that a relatively small number of smallholder farmers have a direct link with supermarkets and agro-processors because their most sales are made at farm gate or at the local market. Baloyi (2010) added that participation of small-scale farmers in high-value markets is not a success because among other things, farmers lack appropriate support in basic production equipment, which include modern irrigation systems and mechanization, to produce vegetables that meet the formal market standards. However, in Vhembe District, farmers are more linked to the formal markets than those in the Capricorn District.

In Mpumalanga, Randela, Alemu, and Groenewald (2008) explored the factors that significantly influence market participation of small-scale farmer using a logistic regression. More specifically, they intended to verify the impact the transaction costs have on the extent smallholders participate in markets. Their results agreed with the prior expectations that the market participation of farmers is greatly affected by high transaction costs. They also found that farmers who owned a vehicle, had access to market information, were closest to markets and are able to communicate in English, would likely incur lower market transaction costs and therefore, are more likely to participate in markets. Furthermore, land size and availability of livestock were found to have a significant influence on market participation.

In the Eastern Cape, the realities of smallholder farmers is that they struggle to increase their production volumes, because of the low levels of investment in communal lands. Yet, the Province holds a vast unused arable land with enormous potential for agricultural development (Sihlobo, 2017). More than a decade after the democratic rule and the agrarian reforms, farmers fail to secure contractual investments. Mostly because private business is not encouraged to invest in small-scale partly because of the poor and varying production volumes (Sihlobo, 2017). Jari (2009) reiterates that not having trading collaborates lead to poor bargaining power, which in turn translates into high transaction

costs. Moreover, farmers struggle in meeting rigorous food safety standards and therefore cannot secure any lucrative contracts. They lack skills, and mostly rely on intermediaries because of their remoteness to towns; poor roads, lack of agricultural infrastructure, access to market information and poor existence of extensive social capital (Jari & Fraser, 2012; Jari, 2009) serve them.

Maponya, *et al.* (2015) explored 49 agricultural projects in nine local municipalities in the Sarah Baartman district. From the examination they carried, Maponya, *et al.* (2015) discovered that the representatives of project beneficiaries have acquired training on (i) Soil preparation (ii) Seed sowing (iii) Marketing (iv) Post-harvest handling (v) Harvesting (vi) Pests and Diseases and (vii) Transplanting. Which at least gives them an advantage compared to most small-scale in the province. However, their market participation faces similar challenges as the rest of the province's farmers. Thus, except for their household characteristics, farmers still have issues with the acquisition of land, land size, water source, and water rights. Hlomendlini (2015) who also estimate market participation revealed similar results and the quantity of maize sold among rural households through the double hurdle model. Besides, family size and land availability has a significant impact in increasing surpluses. Hence, their findings revealed an increased probability of participation and the amount of maize sales. This confirms that the land reform program has not achieved the goals it was intended for.

Khapayi and Celliers (2016) in King Williams Town (KWT) carried out a descriptive analysis to investigate the factors limiting farming households from a successful transitory process into commercial agricultural markets. It was established in the findings again that the challenges in this area are not any different from other areas in the Province. Similarly, smallholders in KWT are also affect by poor physical infrastructures, poor access to production land and agricultural implements to expand and improve production, the expertise and lower levels of education. According to Khapayi and Celliers (2016), it cannot be missed to overemphasize the need for government intervention in addressing such obstacles if lives are to be made better and poverty is eradicated. For example, for smooth transportation of farm produce and accessibility of output markets, it is

government responsibility to construct or upgrade roads, including the establishment of the rural based market.

Kekana and Maponya (2017) attempt to identify market needs of the smallholders in Alfred Nzo District. The study covered 48 horticultural projects from areas of Umzimvubu, Matatiele, Ntabankulu and Bizana Municipalities. The univariate regressions were used and it revealed a strong association between farmer demographic characteristics, land size, water source and training related to agricultural activities. However, farmers being far from markets including their lack of access to inputs, irrigation systems and equipment hindered their participation. Compared to the Sarah Baartman Municipality who received extensive training in a range of agricultural activities, farmers in the Alfred Nzo Municipality lack such knowledge. This also reflects the discrepancies in governmental service delivering in the Province.

Sihlobo (2017) observed a similar pattern as with the rest of the African continent that farmers in communal societies lack capital and have no access to capital. Regardless of the numerous farming programmes, which were aimed to support mostly small-scale and emerging farmers, the Eastern Cape is still one of those areas where farmers still lag in terms of accessing such support.

Given the current communal land arrangements in the homelands, majority of the farmers still do not have their land rights restored. As a result, many cannot have access to credit and secure loans for further investment because they do not have collateral. Consequently, farmers end up withdrawing from the sector. Regrettably, the Province is missing out on the jobs that could potentially be created if farmers participate in formal markets (Cloete, van der Merwe & Saayman, 2015).

### **2.3.2 Overview of literature on smallholder market participation**

From the above review of the literature, it can be inferred that access to land and land issues have greatly affected farmers' progress in both productions, attracting investments

and sourcing of funds as land ownership and land rights are forfeited. It is also clear that farmers are excluded from various opportunities the mainstream economy has to offer because of their geographical location, which also have a significant bearing on the transaction costs. Despite their experience in farming including the support they get from government, smallholders continue to produce below capacity. They struggle to be competitive because a greater portion of their produce is meant for home use, not by choice but because they are typically, poor and the markets on the one side are unaccommodating to them because of their inconsistencies in supply (Mkhonto & Musundire, 2019; Cervantes-Godoy, 2015). Evidently, much still have to done in achieving the agricultural transformation. A gap exists between government efforts and farmers' performance in both the production and the markets, that even if government goes out of its way to support farmers, its efforts are not commensurate with the outcomes in the smallholders' productivities and livelihood. According to Kibirige (2013), this could be because farmers' lack entrepreneurial and appropriate skills, therefore their aspirations and effort are not in line the commercialization goals. Besides, because of their poverty status and food insecurity, farmers' primary goal is food sufficiency.



For the most part of the review, there is an agreement that smallholders in some areas of South Africa do access the market (whether formal or informal), although there are challenges and constraints. However, the existence of such challenges as literature pointed out does not stop smallholders from participating in output markets. Yet, the extent to which the farmers participate in markets, particularly in the Eastern Cape is not known. For the sake of measuring progress in achieving commercialisation and poverty reduction, the need for measurements of market participation arises. This current study is therefore undertaken to bridge the gap and bring to the fore, the level at which smallholders in the former homelands participate and the clear understanding of the factor affecting their level of participation.

## 2.4 Commercialisation of smallholder agriculture

Smallholder commercialization occurs when a farmer engages in agricultural markets (Tilahun, Haji, Zemedu & Alemu, 2019) either as a buyer or a seller, including adopting the new production technologies (Hagos & Geta, 2016). Commercialisation of smallholder agriculture may then be defined as the process whereby a portion of agricultural production is exchanged for cash in the market (Govere & Jayne, 1999). Tilahun, *et al.* (2019) also refer it to as the degree to which agricultural output is marketed and/or the purchasing of inputs from the agricultural markets. Thus, commercialisation entails market orientation (Gebremedhin & Jaleta, 2010), which involves a transition from subsistence-oriented farming, which is purely production for food supplies, to the production intended for market (Hagos & Geta, 2016). Commercialisation can then be seen as the resultant effect of the simultaneous decision-making behaviour where an individual farm household makes a decision to produce for market and to actually take a step to sell the produce in the market (Govere, *et al.*, 1999).

The process of commercialization among the smallholder farmers may occur in two ways (Osmani & Hossain, 2015); firstly by farmers increasing their productivity levels and marketed surplus of the food crops (Tilahun, Haji, Zemedu & Alemu, 2019), this ensures that the household is food sufficient while also earning income. Secondly, by focusing on production of cash crops. The farmer's advantage is that they capitalize on their specialization and gain a comparative advantage from producing the same kind of output.

### 2.4.1 Levels of commercialisation

The marketable quantities of products help to measure the level or degree of commercialization of the crop enterprise. In that case, the higher marketable surpluses of the total production indicate the greater market orientation of the farmer; the lower quantities of surpluses of the total production on the other hand means that production is more subsistence-oriented (Olowogbon & Fakayode, 2013). Commercialisation can be

categorized into three levels namely: subsistence system, semi-commercial/transitory and commercial system (Food and Agriculture Organization (FAO), 1989).

Subsistence farming systems is about those farmers whose marketable surplus is below 25 percent of their total production (Kibirige, 2013). In this system, farmer's main production decision is purely food provision and production depends household generated inputs (FAO, 1989).

The second group comprises the semi-commercial, transitory systems, or emerging in South Africa (Chikazunga & Paradza, 2012). For this group of farmers, although the purpose is clearly production for market, the objective is still to first satisfy the home consumption and explore the market opportunities. The production of marketable surplus ranges from 25 to 50 percent of the total production (FAO, 1989).

The third category represents farmers whose production is purely market-oriented. The marketable surplus in the category is more than 50 percent of the total production (Kibirige, 2013). In this system, the inputs are purchased from the markets and farmers' primary motive for production is pure profit maximisation (Jaleta, Gebremedhin & Hoekstra, 2009). Table 2.1 presents the classifications of the farming system based on the level of marketable surplus.

**Table 2.1 Level of Market Participation with increasing Commercialisation**

<b>Market participation Level</b>	<b>Farmer objective</b>	<b>Input Source</b>	<b>Product mix</b>	<b>Income source</b>
Subsistence systems	Food self-sufficiency	Household generated (nontraded)	Wide range	Predominantly agriculture
Semi-commercial systems	Surplus generation	Mix of traded and non-traded inputs	Moderately specialized	Agricultural / non-agricultural
Commercial systems	Profit maximization	Predominantly traded inputs	Highly specialized	Predominantly non-agricultural

**Source: Abera (2007)**

The typical path for smallholder farmer transiting into commercialisation starts from increasing the marketable surplus of staples until it dominates the household's total output, or by diversifying crops between the staples and other food crops (Hagos & Geta, 2016). Another route can be a combination of both the staples for own consumption and cash crops specifically for the market (Gebre-Ab, 2006). A third and an unusual path is a direct switch over and total replacement of staples by cash crop production (Gebreselassie & Sharp, 2008).

#### **2.4.2 Measure of commercialisation**

At the farm household level, commercialisation is measured simply as the percentage of marketed output to total farm production (Ssajakambwe, Elepu, Walekhwa & Mulebeke, 2019), which can also be referred to as the commercialisation index. The index has however received so much criticism among the scholars like Gebreselassie & Ludit (2008). It is argued that the index does not make no clear difference between a farmer who produces a bag, for example, of maize, and sells that one bag of maize (Wiggins &

Keats, 2013) and one who produces 50 bags of maize and sold only 20 of them. The index implies that a farmer who one bag of maize has sold a 100 percent of his produce, meaning that the farmer fully commercialised. On the other hand, one who sold only 20 bags of maize out of the 50 bags, can be considered semi-commercial (Wiggins & Keats, 2013). Gebre-Ab (2006) rather suggests setting a specific minimum level that can be taken as the cut-off level, so that an output above that level can be used to establish the different levels of commercialisation (Gebre-Ab, 2006). Thus, a household transition from subsistence production only when the proportion of its sales increases beyond the set threshold. Similarly, the input side of commercialisation can be computed as the amount of inputs purchased from the market to the total amount of all inputs in the market (Cazzuffi, McKay & Perge, 2018).

### **2.4.3 Factors for successful commercialisation**

Development economists have generally emphasized commercialisation of smallholder farmer production as a developmental pathway. This is built on the premise that if improved technological adoption coupled with increased market participation is adhered to, there is no doubt that households' income would be increased. Commercialization allows farmers to maximize their returns to their factors of production such as labour and land through market opportunities, where they have an opportunity to earn the benefits beyond subsistence production (Asuming-Brempong *et al.*, 2013). However, achieving such a transformation within the smallholder farmers' production has been accompanied by intense hindrances especially in Sub-Saharan Africa (Delgado, 1995). Scholars in the field of agricultural development in developing countries are of the idea that if the market factors as mentioned in section 2.3.1, including;

- a) by climatic conditions and agro-associated risks
- b) resources allocation
- c) advancement of local product
- d) institutions and regulations
- e) Cultural and societal factors affecting consumption preference and patterns,
- f) Input and output prices

- g) integration into the output market

From the analysis of the aforementioned, Leavy and Poulton (2007) narrowed down the list to three critical conditions for consideration namely;

- a) access to markets
- b) sufficiency of staple foods, and
- c) asset accumulation

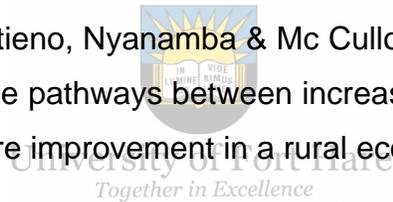
This means that commercialization requires efficient allocation of resources, increased production beyond staples and effective participation through marketable surplus (Mmbando, 2014). Generally, the success of commercialization depends highly on the connectivity of farmers to the exchange economy with efficient and well-functioning markets (IFAD, 2003; Eskola, 2005; World Bank, 2008).

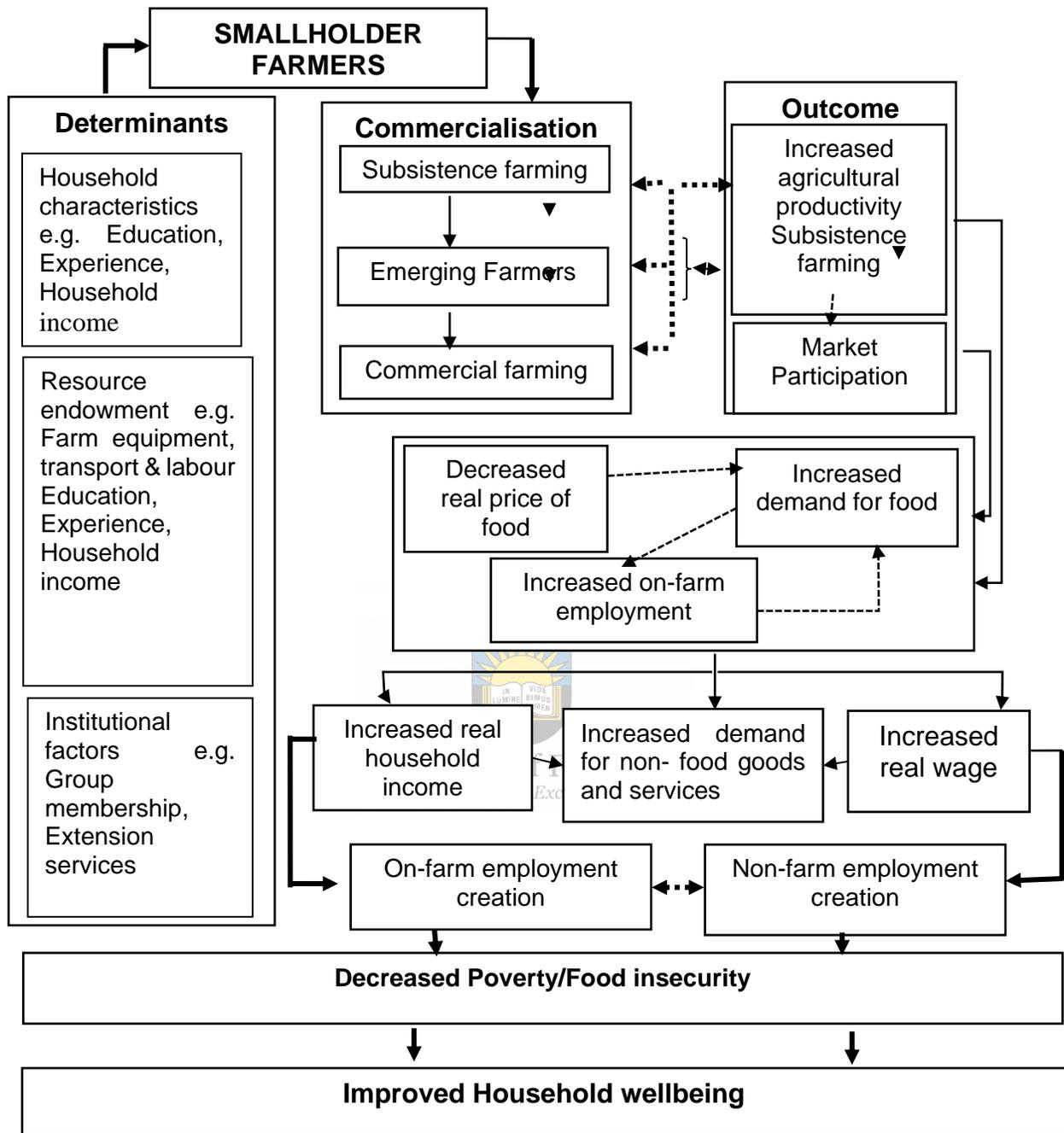
Leavy and Poulton (2007) as cited in Abera (2007), identified access to food markets and food production as one other critical condition for viable agricultural commercialisation. According to Leavy and Poulton (2007) farming households have a choice to focus their production on food crop or cash crop production. If small-scale production is focused on high valued cash crops and farmers sell their produce, they can then earn good cash and buy food crops from the market. However, many have argued that under the conditions of imperfect markets especially in Africa, farmers are at the risk of food price volatility and food insecurity (Abera, 2009). Hence, smallholder prioritises production for home consumption and in the process forfeits the incomes, they could have earned should they diversify into cash crop production (Abera, 2009; Ngqangweni, *et al.*, 2016).

Asset accumulation is the third critical factor of commercialisation. Most importantly, encompassed in the accumulation of assets is access to land (Poulton, 2017). According to Poulton (2017), farmers with small landholdings are limited to production for home consumption.

#### 2.4.4 Role of markets

The significant role that commercialisation of smallholder play in achieving the poverty goals is well supported in the scholarly literature, Obi *et al.* (2012); Omiti *et al.* (2009); Gani and Adeoti (2011); Hlomendlini (2015); Jari and Fraser (2012); Pender and Alemu (2007); Baiphethi and Jacobs (2009), and Jaleta, *et al.* (2009) to mention but a few. Many of these studies extensively demonstrated how incomes at household level can be increased when the farm resources are efficiently used and redirected from subsistence crops to commercial crops. The model, commercialisation brings greater specialization in various aspect of household resulting in productivity improvements, higher and food security which in turn will influence their welfare (Mujuru & Obi, 2020). These impacts occur in two ways; from the consumer perspective, their purchasing power is increased when food prices are lower (Onoja & Ajie, 2016), while low food prices enables producers to reorganise themselves and redirect their resources to high-value non-farm enterprises (Geda *et al.*, 2001; Omiti, Otieno, Nyanamba & Mc Cullough, 2009). Below in Figure 2.1 is a framework illustrating the pathways between increasing agricultural productivity and poverty reduction and welfare improvement in a rural economy.





**Figure 2.1 Smallholder transformation process and Household Wellbeing**  
 Source: Modified from (Schneider & Gugerty, 2011)

According to the framework in Figure 2.1, smallholder farmers are affected by a variety of factors including their own personal characteristics as illustrated on the left side of the framework. A combination of these factors can either enhance or hinder their transformation process through which smallholder farmers develop from subsistence

level of farming to the semi-subsistence or emerging through to the final stage where farmers are become fully commercialised. For example, lack or poor infrastructure, remoteness of the farms, inadequate access to storage facilities and low-income level including unfavourable land tenure system can cause a rise in transaction costs. This considerably have impact on both production and potential for market participation (Mmbando, 2014; Adepoju, Oyegoke & Amusan, 2020; Poole, 2017).

Through the stages of farming, the full endowment of resources by smallholder farmers plus the enabling environment would likely boost productivity, resulting in production beyond farmers' consumption needs and eventually drive market participation (Rios, Masters & Shively, 2008). In favourable conditions, the increased market participation in return would provide incentives in cash flows which when reinvested could drive productivity (FAO, 2017) and enhance farmers' transition to the next level of commercialization. Thus, the mutually reinforcing relationship between productivity growth and smallholder market participation.



Both the increased productivity and market participation can also directly affect the poor farmers by generating more employment opportunities in the sector, which is likely to boost relative wages, increased demand for food and indirectly reducing the real price for food since there is excess supply of food (Rios, *et al.*, 2009). The increased employment opportunities on the other hand means the rising household incomes and an opportunity for farmers to afford other non-agricultural goods (Abraham & Pingali, 2020) and services like education and appliances that improve the quality lives (Mmbando, Wale, & Baiyegunhi, 2015). Whilst in low-productivity systems, there is either no surpluses or the surpluses are too low to have any significant impacts for reinvestments (Paloma, *et al.*, 2020). In general, this would mean that commercialization is not taking place. According to Pender and Alemu (2007), increasing production is central to increased sales, which will spur improvements in commercialisation and generate significant multiplier effects.

Although small-farmers struggle to meet the quality standards and quantity demanded by the end-users, the more the demands of the end-users are met, the more the demand for

their goods and services also increases, subsequently the smallholder farmer income increases (Hlomendlini, 2015; Obi *et al.*, 2012). By raising incomes, farmers gain the purchasing power, meaning that their demand for other non-farm products is increased. In turn, employment and growth in the non-farm sectors are enhanced (Nwafor, 2015; Burchi & De Muro, 2016). Although the subsequent impact of this is the gradual withdrawal of labour from the farm in favour of more viable non-farm activities, as the demand for non-farm activities increases, demand for skilled/unskilled labour rises, the rising demand in skilled labours means improvements in education and the general improvements of the economy (Jayne, 2014; Jayne, Haggblade, Nicholas Minot, & Rashid, 2011).

In South Africa, although the rural households continue to diversify their livelihoods, the reality is that they are much more likely to purchase food than to exploit the environment to generate income or to produce their own food (Baiphethi & Jacobs, 2009). This is confirmed by the fact that the rural households engage mostly in activities that maximizes their non-agricultural sources of income (Mujuru & Obi, 2020). Hence, rebuilding the small scale and subsistence farmers in rural has been is a serious challenge for government.



## **2.5 Commercialisation in South Africa**

One of the major policy goals and the overarching targets of some African associations notably: the Comprehensive Africa Agriculture Development Programme (CAADP) (2002) and Forum for Agricultural Research in Africa (FARA) (2014), is for governments in Africa to adopt policies that promote agriculture and rural development. This is to encourage governments to accelerate economic progression, to boost the productivities, while reduce food insecurity and poverty (Harsmar, 2007).

In response to the call, the CAAD programme was implemented in South Africa in 2011 in view to accelerate commercialisation of particularly black smallholder farmers and expectantly reduce poverty. However, a decade later, the white commercial farmers still dominates the sector and operate on about 86 percent of productive agricultural land

while black small-scale farmers occupy only 14 percent of unproductive farmland (Ortmann & King, 2006) and continue unsuccessful subsistence farmers and also serve as labour surplus for white commercial farmers (Sebola, 2018). In the phase of all government efforts, commercialisation can only be brought about in the presence of a business spirit, which according to Paterson (2002) is lacking among the small-scale farmers who would rather work for a salary in the sector.

Entrepreneurial spirit can be described as being “*creative and constantly looking for opportunities to improve or expand businesses for increased profits*” (Kibirige, 2013). According to Kibirige (2013), entrepreneurs are goal-oriented; they persistently devote their efforts and energy in their set goals and willingly take initiatives, display a strong sense of commitment and have the ability to run a profitable business. Farmer entrepreneurship entails three critical facets;

- i) risk-taking
- ii) innovativeness
- iii) The desire for growth and expansion



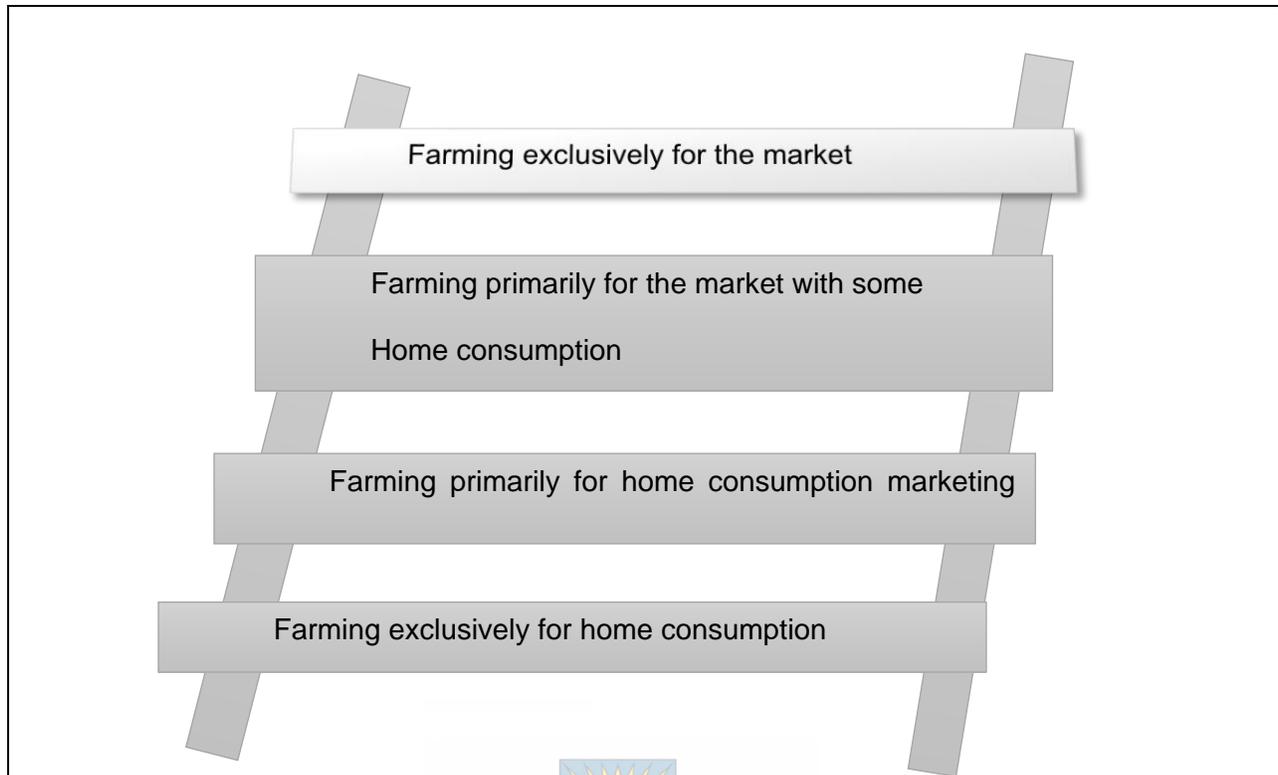
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Considering the three facets, Musaka *et al.* (2016) defined farmer entrepreneurship as a process and action of having farmers engaged in the organization and management of any of the farming enterprise whilst innovatively applying relevant skills and experiences to achieve sustainable expansion of their farming operations. Being entrepreneurs, farmers must be in a position to bear the certain level of uncertainty associated with the farming enterprise and have the preparedness to take the calculated economic risk, try new ideas and opportunities whilst aware of the potential resistance and strategically navigating through the hurdles to achieve and maximize real profits (Avuletey & Obi, 2015).

Given the changing role of agriculture, farmers also need to become more entrepreneurial. According to Pandeti (2005) in Muthupi (2014), an entrepreneur is someone who has the willingness and ability to identify economic opportunities, and are able to explore strategies to exploit such opportunities into profit. They must have the

ability to improve and add value in a unique way to the ones that already exist in a calculated and minimal risk possible. The concept entrepreneurship then involves the efforts an individual makes to identify opportunities and allocating resources to exploit such opportunities (Thindisa, 2014; Pahuja & Sanjeev, 2015). As a farmer, being an entrepreneur means being able to adopt new ideas earlier than others in the sector are, being able to evaluate available alternatives and choose the most appropriate alternative that would maximize the farm profit. Thus, for achieving profitability, growth, and commercialisation, the small-scale farmers need to possess all of the qualities of an entrepreneur and more. That is, they do not only require innovativeness but must have command and exercise leadership ability, excellent coordination of activities, they must be progressive and manage their farm businesses as long-term ventures (Kahan, 2012).

The Sub-Saharan African small-scale farmers have of recent become market-oriented (Harsmar, 2007). However, they still face the challenge of poor resources. Several alternatives in terms of technology have been applied to increase productivity and diversification of production. According to Kahan (2012), farm entrepreneurs understand that the possibility of their success is determined by the market. When the search for opportunities and profits, they know that, these can be found in the market. When the farm-entrepreneurs farm, it is often for one of the following reasons as illustrated in the ladder of intentions for farming shown in Figure 2.2.



**Figure 2.2 Hierarchy of Intention and reason for farming**  
**Source: Kahan (2012)**

In Figure 2.2, the first and bottom step of the ladder represents farmers who farm purely for home food supplies. According to Kahan (2012), this class of farmers is risk averse and are rarely in the position to commit to entrepreneurial tasks. Should they have surpluses, they are likely to sell but they face challenges in accessing land, finance and information.

The second rank of the ladder, correspond to those farmers with higher opportunities, albeit limited in producing more than is required for household consumption. This group of farmers are pre-entrepreneurial, meaning that they sell many various products including agricultural produce and they require support to be standalone farmers. Although they sell surpluses of their produce, they have low expectations for reward because but they do not realize farming as a business. So, they have a poor understanding of the requirements of a successful business, therefore, switching to cash crops is a risky they are not ready to take (Kahan, 2012).

The third step corresponds to farmers who understands the behaviour of markets but are subjected to limited access to finance and market information. Because of the market uncertainties, their market participation decision making is often dependant on how willing and prepared they are to take risks (Kahan, 2012).

In the last and upper step of the ladder, farmers are fully market-oriented. These farmers are profit driven and therefore their production is primarily market based. Thus highly entrepreneurial (Kahan, 2012).

Although, the government in South Africa has made efforts to financially support and advance the smallholder agriculture, farmers lack entrepreneurial spirit and motivation (Avuletey & Obi, 2015). As a result, they survive only in a period of 3.6 years after their establishment and only about 1.7 percent of small businesses survive beyond this period. Hence, smallholder production remain low and the sector remain underdeveloped (Kibirige, 2013; Avuletey & Obi, 2015).



The reality of South Africa in commercial farming has been the persistent decline of the commercial farming units. Table 2.4 below presents a summary of the numbers of the commercial farming units from the year 2000 to 2017.

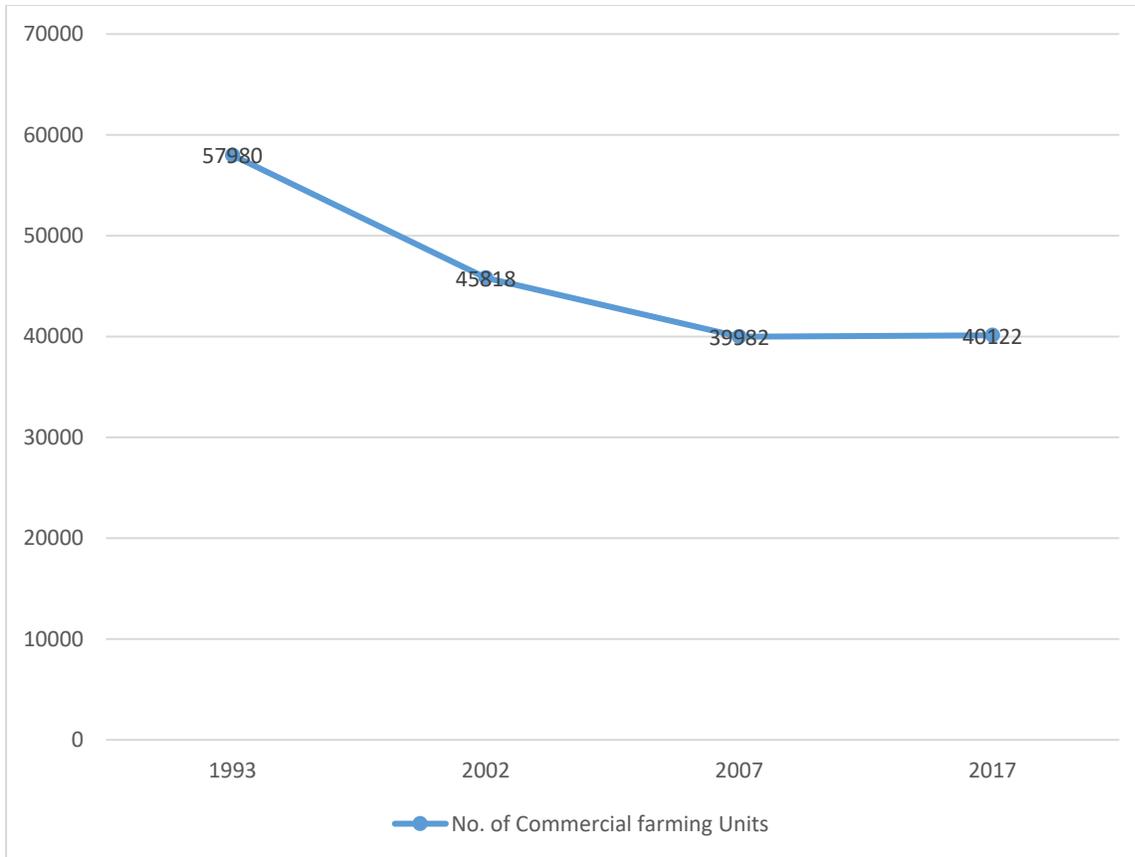
**Table 2.2 Commercial farming Units in South Africa**

PROVINCE	2002	2007	Growth/ decline	2017	Growth/ decline
<b>Eastern Cape</b>	4 376	3 896	- 10.97	4214	8.16
<b>Free State</b>	8 531	7 515	- 11.91	7951	5.8
<b>Gauteng</b>	2 206	2 378	7.80	2291	-3.66
<b>KwaZulu-Natal</b>	4 038	3 560	- 11.84	3103	12.84
<b>Limpopo</b>	2 915	2 657	- 8.85	3054	14.9
<b>Mpumalanga</b>	5 104	3 376	- 33.86	2823	-16.4
<b>North West</b>	5 349	4 692	- 12.28	4920	4.75
<b>Northern Cape</b>	6 114	5 226	- 14.52	4829	--7.6
<b>Western Cape</b>	7 187	6 682	- 7.03	6937	3.82
<b>Total</b>	<b>45 818</b>	<b>39 982</b>	- 12.74	<b>40 122</b>	<b>0.35</b>

Source: AgriSETA (2010); Stats SA (2017)

The data on the Table 2.4 shows that there has been a 12.7 percent decrease in the numbers of the farming enterprises between the period 2002 and 2007, implying that the sector is either not attractive or poses a lot of challenges that farmers easily migrate to the industry. However, in 2017, the census for commercial farming recorded and increase of farm units from 39982 in 2007 to 40 122 in 2017. That is an increase of 0.35 percent in 2017 (Stats SA, 2017).

Figure 2.3 also shows a clear evidence of a declining trend in the numbers of farming enterprises in the period between 1993 and 2017 indicating an unfavourable and significant decrease of about 26 percent (Stats SA, 2017). Although an increase was realized in 2017, the change is so little that the farming units remain less than the units reported in 1993 and 2007 do.



**Figure 2.3 Commercial Farming units in South Africa**  
**Source: Stats SA (2017)**

### 2.5.1 Smallholder development and support

South Africa has since introduced numerous strategies and programmes specifically in the agricultural sector to remove the disparities between large commercial farmers who were mostly white farmers and small-scale farmers who are mostly black and poor farmers. Such programmes as the Land reform programme, the formalisation of tenure relations, deregulation of agricultural markets and AgriBEE (Dzivakwi, 2010) targeted smallholder farmers as the main driver for the sectoral development and improve the lives of at least 370 000 people in the former homelands (South Africa's National Development Plan, (NDP), 2017). Through this initiative, the plan was to boost production and increase the numbers smallholder producers from 200 000 to 500 000 smallholders by 2020 (Aliber & Hall, 2012).

In 2015, the plan to bring transformation in rural areas through agricultural development and rural development value chains, continued (DAFF, 2017; SONA, 2015). In addition to the Land Reform and Rural Development programme, the Nine-Point Plan and Operation Phakisa for Agriculture were implemented to remove the impediments to growth and support producers through production and markets including fast-tracking land reform process. In this respect, DAFF allocated R263 million to the Comprehensive Agricultural Support Programme (CASP) and Illima/Letsema to support, 3 584 subsistence and smallholder farmers and about 147 black commercial farmers in the Eastern Cape Province (DAFF, 2017).

### **2.5.2 Land Reform**

Having land and providing adequate rights of access to land is a way of empowering the poor farmers for self-sufficiency and sustainable and progressive agricultural development (FAO, 2011). This is particularly crucial in resource-poor contexts where land is an indispensable and real asset. Some previous research such as Kane-Berman (2016) has shown a perfect relationship between poverty and the land dispossession, especially among the black population who were unjustly evicted through the racial discriminatory Land Act of 1913.

For South Africa, reversing land dispossession through the Land reform programme has been a key element of the Reconstruction and Development Program (RDP) designed to tackle black poverty and exclusion. Restoring land to people who were previously evicted has been the policy challenge undertaken since 1994 (Van der Westhuizen, 2005). The three basic components of land reform namely, restitution, redistribution and tenure reform (Kepe & Tessaro, 2013) were focused on improving access to land by buying back the land from the white farmers and transferring the land rights to the rightful owners whose land rights were compromised (Kepe & Tessaro, 2013). More specifically, the land and agrarian reform programme aimed to heighten the numbers of black agribusinesses (Kepe & Tessaro, 2013; De Villiers, 2003), support emerging black farmers to be in position to expand their operations and make agriculture more productive. Such

productivity increase would lead to the generation of high enough revenue to contribute to poverty alleviation and to redistribute income and wealth in favour of the black population (Lyne & Darroch, 2003; Obi, 2011).

Since the take-off of the reforms, the financial support specifically in the agricultural activities and land reform, have amounted to about R48.8 billion” (Department of National Treasury, 2014/15 - 2016/17). Table 2.3 below presents a snapshot of the investments that have gone into agriculture and land reform over the period 2010 to 2016/2017.

**Table 2.3 National Spending on Agriculture and Land reform**

R million (000 000s)	2010/ 2011	2011/ 2012	2012/ 2013	2013/ 2014	2014/ 2015	2015/ 2016	2016/ 2017
	Outcome				Mid-term Outcome		
<b>Agriculture</b>							
Administration	479	582	645	671	696	726	764
Agriculture Production, Health, and Food security	1234	1645	1875	2037	2200	2253	2089
Food Security and Agrarian Reform	1051	1252	1405	1599	1711	1719	1769
Trade Promotion and Market Access	145	190	212	258	294	248	310
<b>Subtotal: Agriculture</b>	<b>2909</b>	<b>3689</b>	<b>4137</b>	<b>4565</b>	<b>4900</b>	<b>4945</b>	<b>4932</b>
Rural Development and Land Reform	7123	7998	8920	9460	9455	9574	10673
Restitution and Land reform	5704	5694	6192	5683	5499	5501	6252
Restitution	3767	2376	2866	2917	2681	2661	3259
Land reform	1937	3318	3327	2766	2818	2839	2993
<b>Total</b>	<b>10032</b>	<b>11666</b>	<b>13057</b>	<b>14025</b>	<b>14355</b>	<b>14515</b>	<b>15605</b>
<b>Percentage share of Agriculture expenditure %</b>							
Administration	16.5	15.9	15.6	14.7	14.2	14.7	15.5
Agriculture Production, Health, and Food Security	42.4	44.8	45.3	44.6	44.9	45.6	42.4
Food Security and Agrarian Reform	36.1	34.1	34.0	35.0	34.9	34.8	35.9
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>
<b>Percentage year on year growth</b>							
Rural Development and Land Reform		12.3	11.5	6.1	-0.0	1.3	11.5
Restitution and Land Reform		-0.2	8.7	-8.2	-3.2	0.0	13.7
Restitution		-36.9	20.6	1.8	-8.1	-0.7	22.4
Land Reform		71.3	0.3	-16.8	1.9	0.7	5.4
<b>Total</b>		<b>16.3</b>	<b>11.9</b>	<b>7.4</b>	<b>2.4</b>	<b>1.1</b>	<b>7.5</b>

**Source: National Treasury (2017)**

Through this spending as can be seen on the Table 2.3, about 11 000 new smallholders were established but in 2016, only 5 381 were active and only 3 910 were linked to markets (Kane-Berman 2016). According to the Presidency report, it is expected that

more land claims are yet to be made in the next three years and the government has set aside R10 billion in the 2016/2017 budget for that purpose.

Although there have been some evident improvements in the livelihoods of those who benefited from the land reform program, the consensus is that little has changed in the land ownership landscape. Similarly, the program has also not yet translated into meaningful improvements in the numbers of black farmers, and neither has it improved the productivity of smallholders (Manona 2005; Aliber & Hart, 2009).

According to the State of the Nation Address (SONA) (2017), the state has only transferred about 9.8 percent of the 82 million hectares of arable land to the black people. This has resulted in the declining number of farming households to 2.3 million households in 2016 from 2.9 million in 2011 (SONA, 2017). However, there are claims that among those who have gained their land rights back only 5 percent own farms, the rest is said to produce under "precarious land-tenure arrangements", which is either leased by the state (15%) or on communal land arrangements (80%) (Kane-Berman 2016). In the Eastern Cape, the relative measure of tenure ownership is through the traditional chiefs and colonially appointed chiefs (Barbour & Sowman 2004; Saunders, 2003), whilst some assume ownership through neighbours' recognition (Lahiff, 2002; Kibirige, 2013).

The challenges surrounding the smooth execution of the land reform process includes the lengthy process of acquisition and the cost of redistribution, which at the point of acquisition, the beneficiaries sells the land (Lubambo, 2011). Other challenges include lack of resources and lack of funding (Barbour & Sowman 2004; Saunders, 2003). to further develop the land, poor monitoring and evaluation and dysfunctional community property associations, and other institutional arrangements (Dzivakwi, 2010).

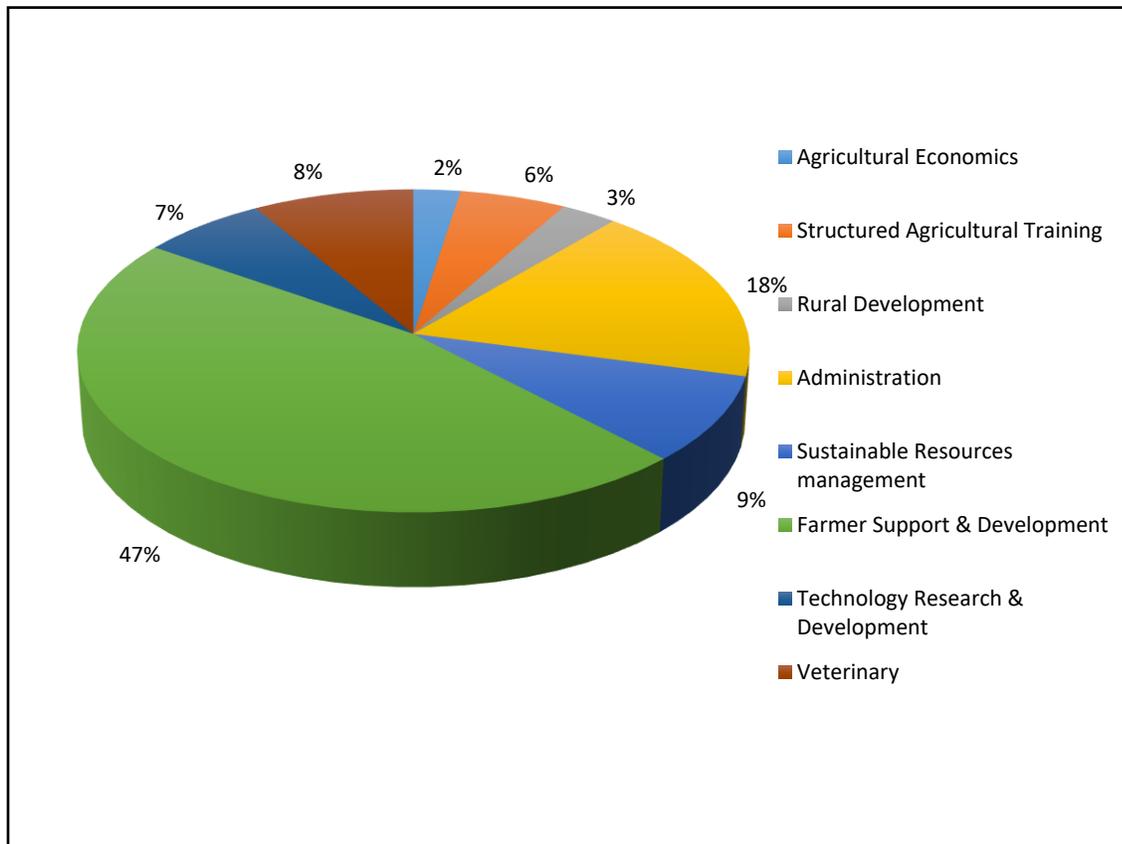
### 2.5.3 Farmer Support Grant

Besides the redistribution and restitution of land, government has provided funding through the Comprehensive Agricultural Support Programme (CASP), Letsema, the Recapitalisation, and Development Programme and Micro-Agricultural Finance Institutions of South Africa (MAFISA). CASP was implemented in 2004 to assist the emerging farmers, black farmers in particular and the land reform beneficiaries to become successful agricultural entrepreneurs. Since its implementation, a support of about R750 million was allocated to the agricultural sector's as contribution towards improving food security, creation of jobs and alleviation of (DAFF, 2017). During this period, a substantial number of agricultural co-operatives were registered, trained for capacity building and connected to financial services and businesses. In addition, mentorship programs were developed and implemented, extension officers were trained and deployed to guide and assist the emerging farmers (GADI) (DAFF, 2017).

Along with the CASP, the Micro Agricultural Financial Institutions of South Africa (MAFISA) was introduced as a component of the financial services for the CASP Programme (DAFF, 2015). The main purpose of MAFISA was to provide finance through credit to farmers for the purposes that include; covering production input, small equipment, harvesting, and agro-processing. The program provided a loan size of R500 000.00 per farmer to R 1 000 000 for special projects (DAFF, 2016).

The Ilima-Letsema programme was launched in 2011 by the DAFF. The purpose of the Ilima-Letsema program was to support vulnerable farming communities by rehabilitating the irrigation schemes and other projects intended for adding value and finally encourage the increased food production (Mokgomo, 2019). The program provided production inputs in the form of a grant to farmers to encourage optimum production in all agricultural projects particularly those in communal areas. Ilima/Letsema grant has so far supported 33 333-subsistence farmers. The DAFF also allocated grants worth of R7.0 billion to support farmers by among other things; the upgrading agricultural colleges and the repairing of damaged infrastructure (Department of National Treasury, 2017). The

following Figure 2.4 is an illustration of the government budget and expenditure on various agricultural programs.



**Figure 2.4 Budget & Expenditure by Program 2010/11-2016/17**  
**Source: National Treasury (2016/2017)**

Based on the data in Figure 2.4, most of the support that amounted to 48.8 percent of provincial agriculture spending was allocated to Farmer Support and Development program for development of the smallholders and improving the sector's potential.

## 2.6 Challenges for commercialisation in SA

A review of literature suggests that smallholders operate in an unfavourable market conditions. Several factors other than farmers being located in remote areas with poor infrastructures, institutional factors have also played a role in limiting the performance of smallholder farmers.

### **2.6.1 Land transfer impact**

Commercial farming is capital intensive. Majority of black farmers struggle to secure support especially in the Eastern Cape. As a result of the slow process of land reform, transfer and title deeds the smallholders find it difficult to secure financial support and access to credit (Tshuma, 2009), because they are not able to use their land as collateral (van Tilburg, Herman & van Schalkwyk, 2012). Similarly, many of the smallholder irrigation schemes are being run under the multi-farmer irrigation projects with individual plots not being larger than 5ha in size. Moreover, government has also failed to support the productive use of transferred land and meanwhile, many have surrendered theirs for rental to the well-resourced white farmers (Ngubane, 2018).

### **2.6.2 Conditions for support**

Even though support was made available to farmers, small-scale farmers fail to meet the conditions for support like production loans such as the CASP, because ownership of the land in question. When Hall and Aliber (2010) explored the land reform issues from about 322 projects across the country, they found that only 20 percent of the CASP funds benefitted the few because of the terms and conditions for accessing the grant. It was clear that the terms and conditions for eligibility effectively excluded the majority of the black farmers more specifically in the former Ciskei and Transkei regions.

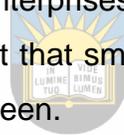
### **2.6.3 Management skill and Market access**

The history of the small-scale irrigation schemes indicate that from establishment of the schemes, government through its agencies took control and fully managed the schemes for the small-scale farmers (Tshuma, 2009). The schemes were fully supported with capital resources such as the machinery, the working capital and access to irrigation water. The farmers' only role was of casual labour for weeding and harvesting (Employment Conditions Commission (ECC), 2013). Unfortunately, this has restricted farmers from learning how to manage and operate the scheme such that when

government finally withdrew and handed over control to the owners (van Koppen, *et al.*, 2009), the performance of most schemes became poor and poorer, and many were abandoned (Mdletshe, 2014).

## 2.7 Summary of the Chapter

The chapter presented a review of the theories underlying smallholder's decisions regarding production, consumption and market participation. Three household production theories namely; utility maximization, profit maximization and agricultural household production theories were reviewed in regard to understanding the behaviour of smallholders towards production and market participation. The utility maximizing theory emphasized on the smallholder farmers being utility maximizers who engages in farm production to ensure survival through food sufficient. The profit maximizing theory on the other hand indicate that as farming enterprises, smallholder farmers are solely motivated by farm profit. Both theories suggest that smallholders are either purely consumers or profit maximizers and nothing in between.



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The agricultural household model on the other hand brings the two theories together by acknowledging that farmers produce and consume the bulk of their output. According to the model, smallholder farmers are neither purely utility or profit maximizers. Farmers are actually indifferent between home production and market production. Participation only occur as a residual outcome of home consumption. The situation that resonates perfectly with the poor smallholder farmers in South Africa. Generally, the agricultural household model explains the behaviour of rural smallholders produce, consume their produce, and only sell the surplus.

The findings from the review revealed that meaningful access to markets and effective participation are a prerequisite not only for ensuring that smallholder farmers are effectively integrated into the mainstream economy but can also have multiplier effects on the general wellbeing of the smallholders including rural development. However, farmers in the country as a whole are still confronted by diverse personal, production,

institutional and market factors that affect their potential to exploit opportunities the markets have to offer. As a result, they still characterized with low productivity level, low income, their marketable surplus remain limited and commercialization remain their farfetched dream.

From the standpoint of development, South Africa has made efforts through several programmes to support farmers to accelerate commercialisation and eventually come out of their poverty situation. For example, the Land reform programmes have not been successful in assisting the smallholders in the land rights claims. For this reason and many others including their perceived lack of entrepreneurial spirit, farmers remain locked in their unproductive subsistence farming and continue to be trapped in the remorseless cycle of poverty.



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## CHAPTER 3

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# POVERTY AND WELFARE OF SMALLHOLDER FARMERS

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### 3.1 Introduction

Reducing poverty and improving livelihoods in rural areas remain a challenging task for South Africa. Understanding how rural people use their diverse activities to sustain a living, is indispensable to unravelling the bottlenecks of poverty and to formulate an effective anti-poverty program. Agriculture remain the mainstay of South Africa's rural livelihoods. The sector's transformation as seen in figure 2.1 in the preceding chapter cannot be discussed in isolation of smallholders and sustainable rural livelihoods. The significant role smallholders play in the sector's transformation cannot be emphasized enough, but its specific role in rural poverty reduction and how it contributes to the welfare of the resource poor farmers is of broader interest for this study. The chapter commence by demonstrating the severity of poverty in South Africa and provides an overview of how the rural poor employ different strategies to maintain their livelihoods and escape their poverty status. The chapter further demonstrate the intertwined relationship between smallholder agricultural production, and welfare improvements of the resource constraints smallholder farmers.

### 3.2 Defining Poverty

Conceptualizing poverty is complex and there has not been a perfect definition because of its multi-dimensional nature. Poverty has been defined with many indicators varying from country to country, region to region according to framing methodologies, and measurements (Olsson, Opondo, Tschakert, Agrawal, Eriksen, Ma, Perch, & Zakieldeem, 2014). Economists define poverty by using the minimum wage or income against poverty line, indicating that anyone earning a wage below the set minimum wage or income is living below the poverty line and such an individual is regarded as poor. The international

definition coined by the World Bank according to conditions in different countries refers to poverty as the

*“Pronounced deprivation in well-being, comprising many dimensions. It includes low incomes and the inability to acquire the basic goods and services necessary for survival with dignity. Poverty also encompasses low levels of health and education, poor access to clean water and sanitation, inadequate physical security, lack of (political) voice, and insufficient capacity and opportunity to better one’s life”.*

According to Rohwerder (2016), poverty can as well be defined as through wellbeing and wellbeing is experienced when people are able to have the things they require and need for their lives to be comfortable. Among the key areas through which wellbeing can be derived, the council had identified, economic sufficiency, effective participation and enabling environment constitutes conditions for a better living (Rohwerder, 2016).

Whilst the definitions of poverty have been debatable, the consensus among scholars and development agents is that poverty is a rural phenomenon. Rural areas not only lack economic opportunities (Baiyegunhi, 2008), but are limited in access to human basic needs and social services such as education and health care (Nale, 2017). Concisely, rural poverty is the state of deprivation<sup>1</sup>, exclusion from minimum basic needs for a productive living. As a result, the people lose command over commodities or resources, and lack capability to function in society (Nallari & Griffith, 2011).

### **3.3 Context of poverty in South Africa**

Poverty in South Africa is perceived as

*“The inability to attain a minimal standard of living in terms of monetary or consumption needs required satisfying them” (Stats SA, 2012).*

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<sup>1</sup> The key deprivations include reasonable income, hunger, social/economic

Based on the revised national poverty line, South Africans are poor if their minimal standard of living is less than R28 (\$1.90) a day, which is around R800 (\$55) per month.

Whether absolute or relative, poverty is fairly how a significant section of the population perceives itself relative to another section of the population (Manona, 2005). For a country where poverty has been linked with the history of apartheid, its effect has left mostly the black population the legacy of extreme social and economic inequalities reflecting in today's society (Grut, Mji, Braathen, & Ingstad, 2012). Before 1994, the majority of black South Africans were deprived a meaningful human and political right and suffered exclusion from participating in not only the political process but also in the economic mainstream (Woolard & Leibbrandt; 1999; Van Der Berg, 2010). It was under this system that the very most assets that were central to life like land and livestock were apprehended from the black people (Nishimwe-Niyimbanira, 2013). The exclusion placed the black population at the bottom of the social hierarchy, leaving them poor and facing widespread social and economic discrimination.



At dawn of the new democratic government, the political and economic space witnessed improvements that created new opportunities for the black population. But it is disappointing to find that for more than twenty years after the liberation from apartheid that the experience of most of the South African households are still unable to have access to health care and education, and majority have limited access to productive resources (van der Westhuizen & Swart, 2015). They therefore continue to live in outright poverty and vulnerability to being poor, yet the country sits at the top six net food exporters in the world (Chikazunga & Paradza, 2012).

So being poor in South Africa is likely being black, being alienated from the economic activities, being food insecure, living in mostly unplanned and poorly serviced crowded homes where people use unsafe and inefficient forms of energy, where people are either adequately paid and/or cannot secure a job. Figure 3.1 and Figure 3.2 below depict the two extreme cases reflecting partially the poverty status in the urban and rural settlement in South Africa where mostly black settle.



**Figure 3.1 Example of Urban Settlement for the Poor in South Africa**  
**Source: Mngxitama (2013).**

Figure 3.1 presents one of the most vivid pictures of urban poverty. It shows an informal shantytown with unplanned crowded houses or shacks built very close to each other with poor materials and with poor municipal services, which leads to high environmental degradation. Many of the urban poor are migrants from rural areas who have moved to the city in pursuit of a better living. In the process, the Eastern Cape and Limpopo Provinces continue to lose about 280 000 and 15 3000 of their people every year (Stats SA, 2012).



**Figure 3.2 Example of Poor Rural Settlement in South Africa**  
**Source: Mngxitama (2013)**

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Figure 3.2, on the other hand, shows the sparsely distributed houses, most of which are dilapidated. The area shows a very well underdeveloped scanty area with no sign of ordinary public services such as water and sanitation and employment opportunities.

### **3.3.1 The Extent of Poverty in South Africa**

Between 2011 and 2015, South Africa experienced the rising numbers of the poor due to low and weak economic growth and unrelenting rise in unemployment levels leading to deteriorating individuals' financial state deteriorated (Stats SA, 2017). Over a half of the population in South African was poor in 2015 (Stats SA, 2017). Below is a Table 3.1 showing the poverty headcounts in the period from 2006 to 2015.

**Table 3.1 Poverty Headcounts by Poverty Line Period 2006-2015**

Poverty Headcounts	2006	2009	2011	2015
Percentage of the population that is UBPL poor	66.6	62.1	53.2	55.5
Number of UBPL poor persons (in millions)	31.6	30.9	7.3	30.4
Percentage of the population that is LBPL poor	51.0	47.6	36.4	40.0
Number of LBPL poor persons (in millions)	24.2	23.7	18.7	21.9
Percentage of the population living in extreme Poverty (below FPL)	28.4	33.5	21.4	25.2
Number of extremely poor persons (in millions)	13.4	16.7	11.0	13.8

**Source: Stats SA (2017)**

According to the data, more than half (55.5 percent, that is approximately, 30.3 million people) of the population in South Africa, is poor and 13 percent live in extreme poverty. The heartbreaking reality is that the effects of poverty hit hard on over 13 million children despite the availability of social welfare grants (Stats SA, 2015).

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South Africa is a racially diverse country. There are Blacks, Whites, Coloreds and Indians. These racial divisions have remarkable implications in the distribution of poverty and deprivation. According to Lehohla poverty can be associated with being a black South African mainly because in South Africa 46.6 percent of blacks are affected by poverty, while only less than one percent of the whites are affected.

Poverty in South Africa is not only rampant but it is also unquestionably a rural phenomenon. This can be seen in Table 3.2 below. The Table 3. 2, shows the different levels of poverty headcounts ratio. The poverty headcount ratio is a ration that captures the number of people within the population who live below a poverty line (World Bank, 2018) across settlement types (rural and urban areas).

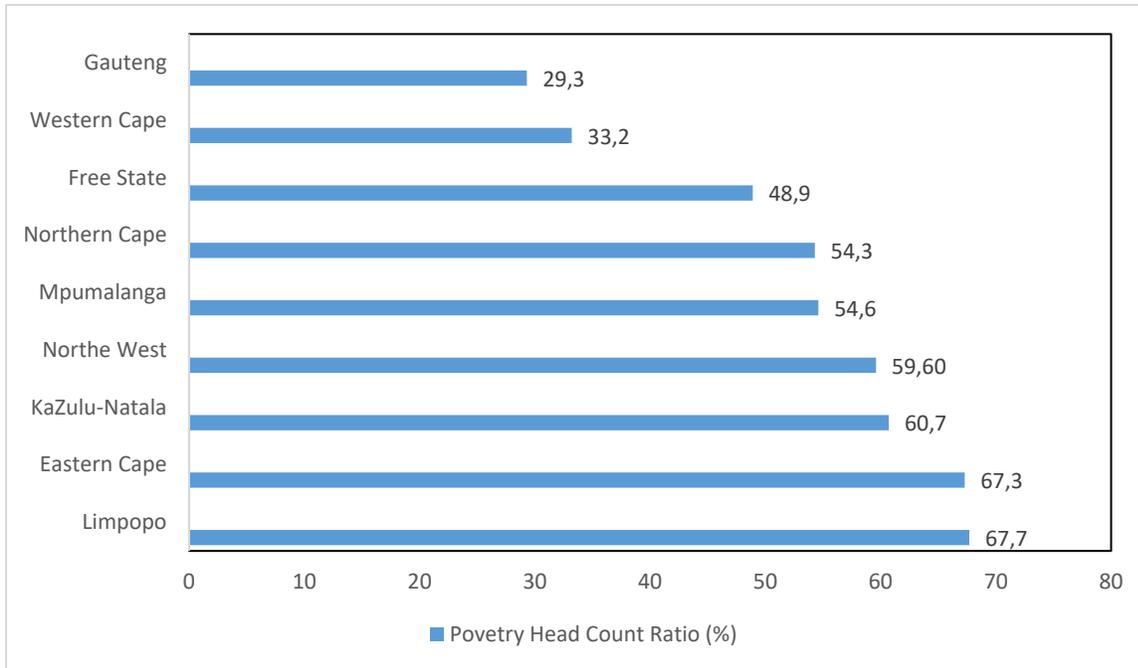
**Table 3.2 Poverty headcounts ratio and area of settlement**

Area of settlement	Period			
	2006	2009	2011	2015
<b>Food poverty line</b>				
Urban	14.6	19.4	12.3	13.4
Rural	48.2	57.4	36.6	45.6
Total	28.4	35.5	21.4	25.2
<b>Lower Bound Poverty Line</b>				
Urban	34.3	31.5	23.1	25.4
Rural	74.9	74.9	58.5	65.4
Total	51.0	47.6	36.4	40.0
<b>Upper Bound Poverty Line</b>				
Urban	52.0	46.8	38.8	40.6
Rural	87.6	88.0	77.0	81.3
Total	66.6	62.2	53.2	55.5

**Source: Stats SA (2017)**

According to Table 3.2, all measures of poverty indicate a decline of poverty rates between 2006 and 2015; however, 25 percent of the South Africa population are unable to afford minimum daily food needs. Although all measures indicate a declining in the proportions of the poor since 2006, the rural areas still report the highest poverty rate, regardless of the measure. As can be seen on the Table 3.2, there is 65 (lower bound line) and 81 (upper bound line) percent of the rural population who are poor and 45 percent cannot afford to have enough food. Like in many other developing economies, these are the people living in a situation that is characterized by a lack of income generating activities close to communities (Manzana, 2014); they are continually confronted by social deprivation and underemployment (Pauw, 2007; Perret, Anseeuw, & Mathebula, 2005).

Furthermore, the communities are also informed by the continuing stagnation, poor production, and low incomes, hence the subsequent rising vulnerability of the poor. Poverty is also distributed unevenly among the nine provinces of South Africa. Figure 3.3 shows the poverty distribution across the nine provinces.



**Figure 3.3 Provincial Poverty Rates in 2015**  
**Source: Stats SA (2015)**



The Eastern Cape provinces have the highest percentage of adult poverty. Approximately 76.3 percent of its adult population are poor. Literature attributes this to the effects of apartheid, which deprived mostly the former homelands from the industrial development sidelining the province's economy to function as the labour reserves for the mining industry (ECSECC, 2019). To this day, the economy of the provinces continue to be characterized by lack and the provinces continue to rank as South Africa's poorest provinces regardless of ample natural resources (ECSECC, 2019).

The Eastern Cape Province has a population of approximately 6.7 million people, equivalent to 12.8 percent of the South African population (Stats SA, 2020). The Majority of the people living in this province face a backlog of living below the poverty line and close to 78 percent can be classified as food insecure with the average monthly household income of approximately R1756.3 (ECSECC, 2019). The province has the highest levels of unemployment and ranks the third in the country in terms of illiteracy rate population (ECSECC, 2019), despite the existence of the four universities and a number of colleges in the province (Ngumbela, et al., 2020). Hence, the poverty status of the province. According to the ECSECC (2012) on an individual level, high literacy correlates

well with the standard of living. Meaning that better education is means for a better income, which then translates into a better standard of living.

Likewise, limited access and poor service delivery compound the challenges of poverty and unemployment in the province (Adom, 2018). The importance of these factors in any poverty alleviation strategy cannot be ignored. For example, the road infrastructure necessitates the transfer and supply of goods to high-value urban markets thereby allowing the necessary connections for local markets to develop as they also facilitate the provision of public services. Road infrastructure allows the ease of movement of people between rural areas and urban centers and opportunities for job creation. On the other hand, the lack of road infrastructure hinders development. (Lelethu, & Okem, 2016).

### **3.4 Poverty and Livelihoods**

Poverty is a multi-dimensional phenomenon, reversing it requires efforts targeting areas that promote economic opportunities and empowerment of the disadvantaged groups (World Bank, 2007). The fundamental idea is identifying the poor, how they fall into poverty, or the manifestations of poverty as well as understanding their activities and strategies they use in making a living. That is, the source of their livelihoods. Maseko (2013) defines livelihoods as the different ways individual households use to seek the basic needs to sustain life.

The concepts likelihood and poverty are linked in terms of assets namely natural, physical, human, financial, and social (Alaba, 2012) that households can access to productively construct a meaningful living and find their way out of poverty. Thus, the livelihood framework highlights not only a productive combination of resources but stresses the significance of “*reproduction, consumption and social relations in securing livelihoods*”. Poverty on the other hand reflects the individuals or households’ inability to accumulate enough resources to meet a minimum acceptable standard capable to derive a living, as a result, their life if exemplified with deprivation and hardship (Olsson, *et al.*, 2014).

Livelihoods are dynamic; therefore, households adapt and change their livelihoods given the production resources they command. Limited access to production factors and other assets may limit households' livelihood options resulting in reduced livelihood outcomes and further deepening of poverty (Liu, et al, 2018). For the rural population, their poverty status has made it difficult for them to secure a meaningful income due to a lack of material resources and financial resources. Most of the rural population survive from engaging in subsistence farming, some sell their labour in exchange for food handouts, and such people fail to work in their fields and such households continue to be in poverty. Hence, the continuing cycle of poverty (Sinyolo, 2016).

Chambers and Conway (1992) distinguished between “livelihoods” and “sustainable livelihoods”. According to Chambers and Conway (1992) when livelihoods is understood as a collective set of capabilities and assets an individual need to make a living, individuals are capable to accumulate resources to derive a living, regardless of their resource status. This definition has since been modified to include

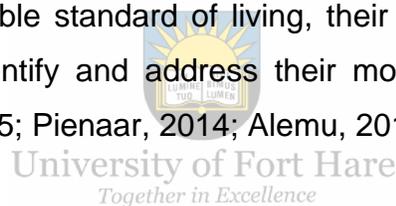
- 
- i) “people and their livelihood capabilities,*
- ii) assets, including both the tangible (resources and stores) and intangible (claims and access), which provide the material and social means that are used to construct livelihoods,*
- iii) activities, that is, what people do; and*
- iv) a living, which refers to the outcomes of what people do” (Christian, 2017).*

Sustainability on the one hand comes if there is a long lasting prospects in the means for sustenance (Dyalvane, 2015). A 'Livelihood' is then sustainable if households are able to combine their resource base and use their different means to derive a minimum living (Christian, 2017). Several studies have applied the Sustainable Livelihood Framework (SLF) to analyses the livelihoods of the poor. The SLF approach emphasizes on encouraging and empowering the poor to diversify their strategies that help them secure their livelihoods (Krantz, 2001). Their resources may refer to a combination of individual skills and abilities, land and water, savings, equipment, and even social relationships, depending on the area of residence, region or country (Khatiwada, Deng, Paudel,

Khatiwada, Zhang & Su, 2017). The success of the SL approach to poverty reduction then depends on how well the poor are able to identify and make efforts to seize the opportunities available to them using whatever resources they have.

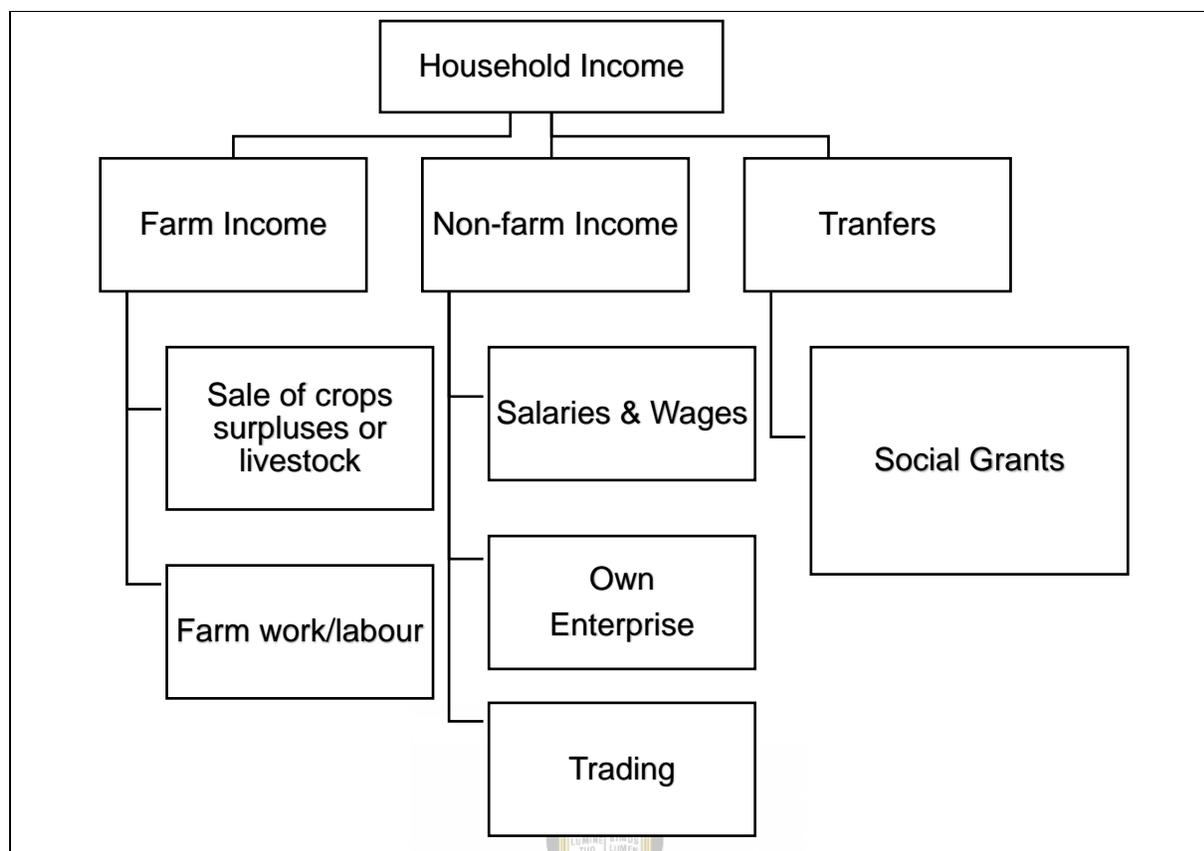
### **3.5 Livelihood strategies of the rural poor**

The SL as a people centered approach, recognizes that the poor are aware and they understand their situation and needs better (Modirapula, 2018). Therefore, sees sustainable poverty reduction as achievable through the participatory approach where for example, government does not undermine their existing livelihood strategies, (Krantz, 2001), rather complement and encourage their ability to adapt and engage them in the policy planning and projects that are intended for empowering them (Igwe, 2013). The primary goal is to take cognizance of the activities they undertake to manage life and sustain at least the affordable standard of living, their ability to put their resources to productive use; and to identify and address their most pressing challenges (Perret, Anseeuw & Mathebula, 2005; Pienaar, 2014; Alemu, 2012).



#### **3.5.1 Livelihoods of rural South African households**

The rural households engage in different livelihood strategies; however, agriculture and other farming related activities remain the best vehicle and sole provider of the much-needed subsistence (Sipoko, 2014). To smallholders, the livelihood theory is relevant since they bring their assets and resources together to undertake activities that produce crops and generate incomes for future investments (Ncube, 2014). In the South African context, it makes more sense when consider the geographical characteristics shown Figures 3.1 and 3.2. Figure 3.4 presents a flow diagram of how rural households in South Africa derive their livelihoods.



**Figure 3.4 Livelihoods strategies of the rural households in South Africa**  
**Source: Mbusi (2013).**

In the diagram, it is shown that rural people have their diverse sources of livelihoods. Some are either farmers or farm workers (Mbusi, 2013). Some livelihoods options are either derived from other non-agricultural activities such as wage employment, own labour, trading, some depend on social grants and remittances (Alemu, 2012). Social grants often form the most reliable and dependable source of livelihood for many rural households in South Africa (Yufonyuy, 2015).

### **3.6 Meeting the poverty reduction goal**

In response to the Sustainable Development Goals (SDGs) (2016) call, which places great emphasis on eradicating poverty throughout the world. South Africa reported an incredible improvement towards achieving the poverty goal by reducing the numbers of people living below the poverty line to at least 4 percent (Obi & Tafa, 2016). However, the

realities of the local South Africans is that poverty remain rife and the rural poor are severely affected (Meyer, 2014).

### **3.6.1 Agriculture and Poverty reduction**

In most developing countries, poverty is a rural phenomenon. It manifests itself when there is a lack of access to basic food production resources, unequal income distribution, and unemployment. Most of the poor are rural-based and agriculture is their primary source of living (BIRTHAL & JOSHI, 2007). Although the early growth and development economists like Lewis (1955) viewed agriculture as a backward, subsistence sector which is only supplies cheap labour, the development theories have identified a correlation between agriculture and poverty reduction, suggesting investment in pro-poor rather than overall growth (Christiaensen, Demery & Kuhl, 2006).

Lewis had ignored the structural transformation for growth but viewed industrialization as critical for economic growth (Mosala, Venter & Bain, 2017). Hence, the ideology of transferring the factor of production from the unproductive agricultural sector towards a more modernised sector with higher productivity to encourage the development of the productive industrial sector (Christiaensen, Demery & Kuhl, 2006). Until the seminal work of the economist Theodore Schultz (1979), who posits that most of the people in the world are poor, and most of them earn their living from agriculture. Therefore, if it is understood how important agriculture is to the poor, then the need for the transformations of the sector will be understood.

Schultz's view was that until the country satisfies the subsistence needs of its people, it is almost impossible to achieve economic transformation. This makes agriculture the most strategic and significant activity for the development process (BIRTHAL & JOSHI, 2007). Todaro and Smith (2011) also recognized that traditional societies are agro-based which then requires investments in traditional agriculture if countries need to attain a higher standard of living for the citizens.

According to Timmer (2007), it is when a country achieve improved agricultural productivity that it can reduce poverty. Since the post-Green Revolution (GR) in Asia, the effort to boost agricultural productivity has proved to be a pathway out of poverty and the rapid development of industry and manufacturing (Taylor, 2012). The econometric evidence estimating the relationship between poverty and agricultural productivity growth revealed that Asia and India has seen a one percent increase in crop productivity, which translated into 0.48 percent and a 1.9 percent reduction of the number of people who are poor in Asia and India respectively (Pingali, 2012).

Gollin, Parente, and Rogerson (2002) and Gollin (2009) presents a simple framework showing the different impacts of agricultural development. In this framework, development is associated with industrialization and industrialization occurs only when the country undergoes a structural transformation, namely, an improvement in agricultural productivity. Structural transformation also withdraws employment from the agricultural sector and moves it into the non-agricultural sector. The model implies a closed economy where food is a necessity, and the process of industrialization starts only after the country can satisfy the basic food needs of its population and later begin to free up resources for the process of industrialization. On the contrary, countries experiencing low agricultural productivity levels would tend to lag behind (Machicado, Rioja & Saravia, 2014).

In this framework, each household is assumed to have preferences over two goods, agricultural good ( $a$ ) and non-agricultural or manufactured good ( $m$ ), mathematically given by:

$$u(a - \bar{a}) + v(m + \bar{m}) \tag{3.1}$$

Where  $u$  and  $v$  are non-negative values. Where  $\bar{a}$  and  $\bar{m}$  are mean values of  $a$  and  $m$ , respectively. The model assumes the increasing functions of  $u$  and  $v$  and that the parameters  $\bar{a}$  and  $\bar{m}$  are both strictly positive. This implies that food needs or agricultural good is income inelastic. That is, changes in or the level of household income does not affect its consumption or quantity demanded. To generate a structural transformation, the

individual household food needs must be satisfied. Implying that the household will allocate its available resources that maximize utility function is given by:

$$u(a - \bar{a}) = \begin{cases} a, & \text{if } (a - \bar{a}) < 0 \\ \bar{a}, & \text{if } (a - \bar{a}) \geq 0 \end{cases} \quad (3.2)$$

Where the food needs utility is maximized when  $(a - \bar{a})$  is equal  $\bar{a}$  and  $\bar{a} > 0$ , if  $a$  is an inferior good or when  $(a - \bar{a})$  is equal  $a$  and  $a \geq 0$ , if  $a$  is a normal good. Once the food needs are satisfied, the lifetime utility function is given by:

$$\sum_{i=0}^{\infty} \beta^i u(a, m) \quad (3.3)$$

It follows that once output in the agricultural sector reaches  $a$ , structural transformation begin to take place and production of the manufactured good requires labour. Regardless of the state of the non-agricultural sector, the labour allocated to agriculture begin to flow out of the sector to other non-agricultural sectors (Gollin, Parente & Rogerson, 2002). Labour productivity in manufacturing is  $A_m$  so that the production of a non-agricultural good is:

$$m = A_m n_m \quad (3.4)$$

Where  $m$  denotes the manufactured good and  $n_m$  is denotes labour allocated to the non-agricultural sector. Production of the agricultural good requires both labour and land, and the technology for producing the agricultural good is given by the production function:

$$a = A_a L^\theta n_a^{1-\theta} \quad (3.5)$$

Where  $A_a$  is the Total Factor Productivity (TFP) parameter,  $L$  is land and  $n_a$  represents the amount of labour (that is, the number of workers).

Gollin (2009) assumes that land ownership is equally distributed across the population, therefore, the economy can produce  $a$  to provide at least  $\bar{a}$  unit of agricultural output. That is that  $A_a > \bar{a}$ .

The problem, however, is for the household to maximize the utility in the face of constraints. Given that all individuals need to consume exactly  $\bar{a}$  units of output, the optimal allocation occurs when there is enough labour to produce  $\bar{a}$  for each individual in the economy, and all remaining labour can be allocated to the non-agricultural sector. It follows that the optimal value for  $n_a$  is given by:

$$n_a = \left( \frac{\bar{a}}{A_a} \right)^{1/(1-\theta)} \quad (3.6)$$

The model signifies a closed economy where food needs is  $a$ . This means that if the agricultural TFP  $A_a$  decreases by one percent, that employment in the agricultural sector will increase by a larger percentage, equal to  $1/(1-\theta)$ . Then a large number of people working in this sector with low productivity levels simply implies a subsistence production (Gollin, 2009), which Gollin and Rogerson, (2014) termed a defining feature of a poor economy.

Sharma and Kumar (2011) examined the role and implications of agriculture in India. Their review of the trends of poverty and the performance of the agricultural sector has shown that improvements in agricultural productivity per ha has significantly increased incomes by 1.6 percent during the 2000s. This resulted in 0.97 percent of reduction in poverty. De Janvry and Sadoulet (2009) on the other hand confirmed that agricultural growth is capable of reducing poverty about three times more than the growth coming from manufacturing and construction sectors.

A lesson that can be learned from the country's most successful in reducing poverty is that as population rapidly grow and urbanization is taking place, agricultural research and agricultural development become a necessity for the growing food needs. The developing communities today are beginning to follow suit and appreciate that if targets poverty goal

is to be met, there is a need for improvements in the livelihood of those who derive their living from agriculture. For developing countries, investments in agriculture for poverty reduction makes even more sense because the majority are the poorest households with few assets and lack skills for employment in other sectors, therefore, agriculture remain their source of food and employment (Grewal, Grunfeld & Sheehan, 2012).

Although Africa is lagging behind in the Green Revolution (GR) Era, it has however, witnessed improvements in yields by using the improved crop genetic varieties (Pingali, 2012). In 2005, the sub-Saharan African yields in wheat reached 70 percent, maize reached 45 percent, rice increased to 26 percent, 19 percent for cassava, and 15 percent for sorghum. This period marked about four times contributions of agriculture to poverty reduction (Pingali, 2012). In South Africa, Hazell (2004) found that significantly for the poor, growth in agricultural yields reduces poverty by at least 0.6 percent to 1.2 percent.

Christiaensen, Demery and Kuhl, (2006), compared the contribution effects between agriculture and non-agriculture of Sub-Saharan Africa (SSA). The findings in their study revealed the least direct impact of agriculture on poverty reduction, but a substantial and larger impact of agriculture through its linkages with non-agriculture. The findings according to the authors suggest that the poor participate much more in the agricultural sector. Therefore, agricultural productivity improvements is the critical pathway in designing effective poverty reduction strategies. However, they suggest that SSA needs the right agricultural technology and improved investments.

### **3.6.2 Significance of Smallholder Agriculture**

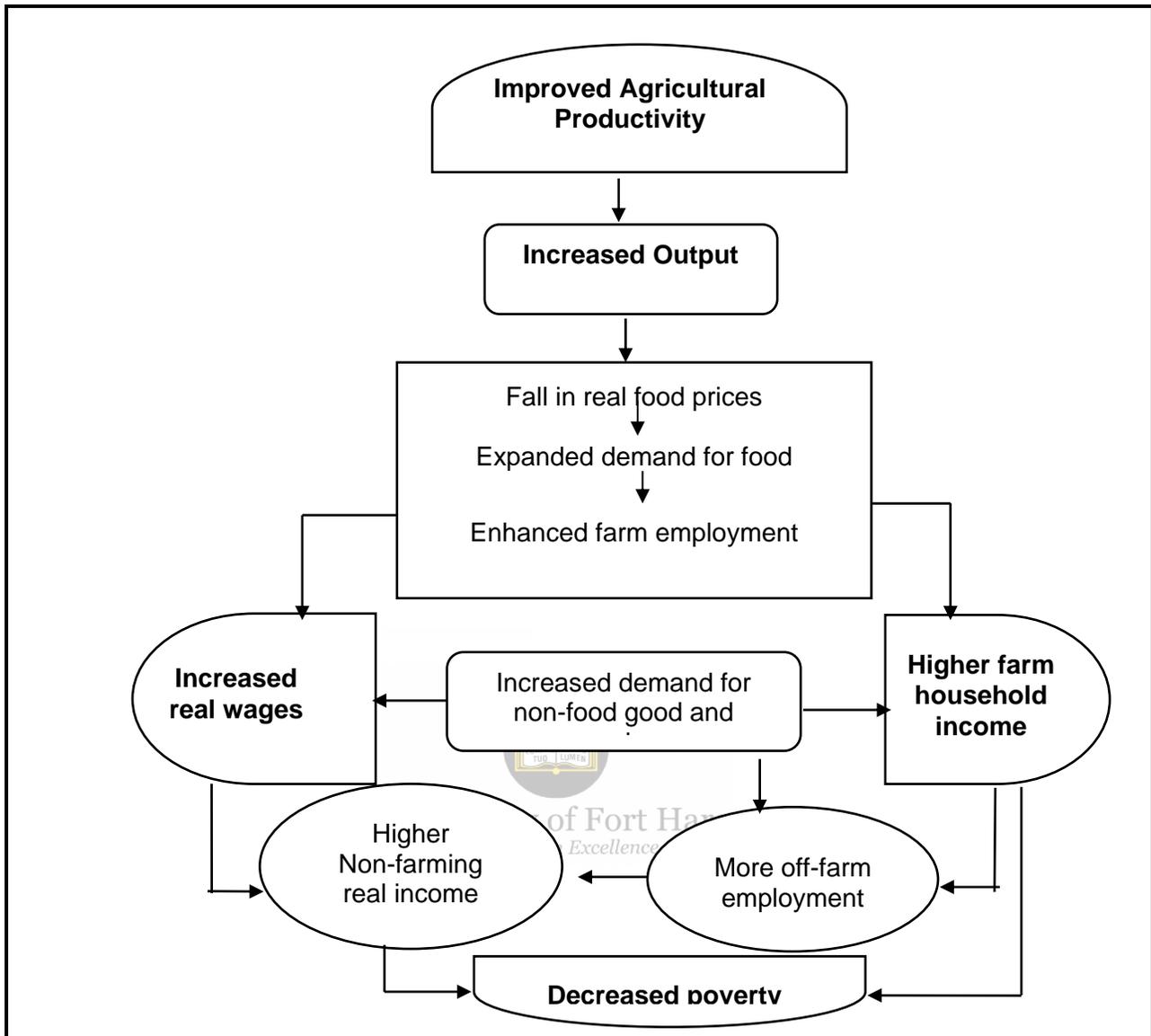
Smallholder agriculture has globally been seen as a means through which livelihoods may be improved, employment increased and food security enhanced as most of the available agricultural land in developing world's is owned by the subsistence or small-scale farmers (Taylor, 2012). Which then means it is difficult to increase the agricultural productivity if the capacity of smallholder farmers remain low (Taylor, 2012). The

supporting view is that smallholder farmers are more efficient because they are likely to use family resources like labour (Dorosh & Haggblade, 2003).

Previous studies identify several potential linkages between smallholder farming and poverty through multiple pathways including food supplies, (Ravallion, 2001; Department for International Development (DFID); 2004; Altman, Hart & Jacobs, 2009; Baiphethi & Jacobs, 2009; FAO, 2011; Mashamaite, 2014) to mention a few. Figure 3.5 illustrates how increases in agricultural productivity interact with poverty to reduce its effect.



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**Figure 3.5 Agricultural Productivity and Poverty Reduction**  
**Source: Ayodeji (2016)**

### 3.6.2.1 Food supplies and Food Security

The global challenge is that of meeting the food needs of the ever-increasing population (Dioula, Deret, Morel, du Vachat, and Kiaya, 2013). The agricultural sector continues to significantly increase food production resulting in more food per capita and smallholders contribute significantly in this respect (Watson, 2008). For example in Asia, food production has increased ahead of population growth supplying around 80% of the food. In South Africa, incredible performance has been demonstrated by approximately 1.2

million households, who produce staple foods at small-scale to ensure household food security (Toringepi, 2016). According to Aliber *et al.* (2010), about 92 percent of these farming households indicated they consciously produce primarily to be food sufficient. In Africa as a whole, smallholders supply about 70 percent of food requirements in the continent (Machethe, 2004; Altman, Hart & Jacobs, 2009; Department for International Development (DFID), 2004; Baiphethi & Jacobs, 2009).

### **3.6.2.2 Food price trends**

There are different views on relationship between food price increases and impact on households and poverty. Higher food prices have adverse effects on net food purchasers (Baiphethi & Jacobs, 2009). This means many households, including the rural households who are net purchasers of food are negatively affected by relative food price increase. If smallholders produce their own food, they are food self-sufficient and if agricultural production is increased, agricultural surplus increases and there is more food to sell in the market. The higher the productivity, the supply and the lower the food prices (Toringepi, 2016). These causal relationships is in turn important to farmers as net sellers because their incomes are boosted and food security is ensured (Dioula, Deret, Morel, du Vachat & Kiaya, 2013).

### **3.6.2.3 Employment**

Much employment can be created especially for most of the poor members of the households in the developing countries (Chikazunga & Paradza, 2012; Aliber *et al.*, 2009). Agricultural activities are labour intensive, labour is needed for planting, weeding and harvesting and so on. Therefore, increasing agricultural productivity leads to the increase in demand for labour (DFID, 2004). According to DFID (2004), as smallholder subsistence farmers gradually increase their productivity and marketable surpluses, they tend to substitute household labour for hired labour, thereby generating greater job opportunities for the poor.

The sector employs over 40 percent of the active labour force globally (International Labour Organisation ILO, 2017). In Asia and the Pacific, over 60 percent of the population depend on agriculture (World Bank, 2006). While about 58.8 percent of the total workforce in the Sub-Sahara are employed in agriculture and 63.6 percent is in the rural areas (UN-FAO (2009). In South Africa, the sector employs only 5 percent of the labour force compared to 23 percent in industry and 72 percent in the service sector (Stats SA, 2011).

#### **3.6.2.4 Household income**

Smallholders contribute up to 40 percent of household income in most developing countries such as South Africa. This income enables the poor to have access to other non-agricultural goods (Van Averbeke & Khosa, 2007). Therefore, as household income increases, households are able to meet their respective needs and maintain a reasonable live style (FAO, 2003; Van Averbeke & Khosa, 2007; Salami, Kamara & Brixiova, 2010). As observed by Ravallion (2001) a 2 percent increase in income has a potential of reducing the rate of poverty by 4 percent.



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While smallholders are increasingly a significant part of the development agenda, they, however, remain poor, with low farm productivity, unable to enjoy the lucrative markets opportunities but they continue to seek livelihood strategies from low yielding agricultural activities because they carry lower risk. In the end, smallholders remain with low incentives and lack exposure to lucrative opportunities (Fan, Brzeska, Keyzer, & Halsema, 2013).

### **3.7 Smallholder agriculture and welfare of rural poor**

Agricultural development does not only aim to increase output but enhance incomes and eventually improvement in the welfare of households and societies (Udemezue & Osegbue, 2018; Poole, 2017). According to Camara (2017), the shift from subsistence practices to the market inclined production can significantly produce positive effects resulting in the rising of household income, by increasing the food consumption budget,

and food intake of household members, which in turn improves household health and nutrition status.

Welfare or a state of well-being can be defined in terms of the level of utility attained by a given individual from the consumption of a bundle of good and services (Ademiluyi, 2014). Greater importance is attached to the individual's perception of what is considered useful to and adequate to them (Ademiluyi, 2014). According Sen and Williams (1982), wellbeing increases as persons produce and consume more of the market goods they prefer, placing emphasis on the role of income and consumption expenditure. Thus, individuals who are poor in income and consumption are poor in other aspects as well and they cannot improve their living conditions. Likewise, those who are able to meet their required or determined minimum level of consumption expenditure are also able to enjoy and maintain a decent living (Collins, 2004).

However, according to Wang, Feng, Xia, and Alkire (2016), these assumptions are not always valid. A poverty measurement from the perspective of income or consumption has limitations because if too many people depend on that income, it lowers affordability and utility levels while a great sense of empowerment and freedom could be attained even at lower income levels. Rather a person's capability to do things of intrinsic worth can be the criterion for assessing the welfare standard regardless of the income or consumption level (Stats SA, 2015). Nevertheless, the economic indicators such as private consumption and poverty line continue to be the most commonly used measures for analysis of poverty.

Welfare analysis is premised upon the Preference-satisfaction theory/Theory of Welfare (Tiberius, 2004). Welfare theory does not restrict consumer choices, rather places emphasis on allowing individuals to decide on the goods of their choice according to their preferences. Therefore, an individual judge their preferences according to their welfare outcomes. The individual's preferences is therefore presented as a set of welfare dimensions (van der Deijl, 2018) stated as follows:

$$W_i = f_i(W_i) \tag{3.7}$$

Where  $W_i$  is an individual welfare function for individual  $i$ ,  $w_i$  a vector of elements that constitute welfare for  $i$ , and  $f_i$  a function that describes how these combine into a welfare value.  $f(w_i)$  is a completely individualized version in which both the contents of  $w_i$  as well as the way they are combined are fully determined by the structure of a person's preferences:

$$W_{pi} \equiv fS_i = f_i(W_i) \quad (3.8)$$

Where  $W_{pi}$  is a measure of welfare.  $W_{pi}$  can also be used to compare preferences among individuals over time. The outcome of this welfare function can be used to evaluate change and therefore can be beneficial for policy change (van der Deijl, 2018).

Welfare, particularly economic welfare measures wealth, success or standard of living as the level of satisfaction brought by ones achievements of goods and services or things they put value on (Olawode, 2021). For example, according to the neoclassical economist Marshall Alfred, there is a strong correlation between people's wellbeing and their level of income. Therefore, the unique way of raising individual wellbeing is through increased income (Mahadea, 2012). That is, assuming the decreasing marginal returns to scale, if poor households engage more in profitable income-generating opportunities, according to the neoclassical economic theory, will eventually converge to their richer counterparts over time (Varian, 2009).

For a farmer, welfare is all about the farmer's effort to engage in economic activities to earn that, which yields the highest levels of satisfaction given production level (Mmbando, 2014). The increased marketed production can in return generate cash surpluses with significant multiplier effects (Gani & Adeoti, 2011). Hichaambwa, Chamberlin and Sitko (2015) found that in Zambia when all other sources of income are held constant, smallholder participation in markets leads to a significant average increase of 242 percent in total household income. Profoundly, participation in horticulture markets does not only

increase the total household income but appears to reduce the gender income disparity (Hichaambwa *et al.*, 2015).

Agricultural development is a pre-requisite for improved livelihoods of millions of people, not only those engaged in agriculture but the community as a whole. Hence, the 2030 strategic vision of South Africa places strong attention and emphasis on the critical role that agriculture plays as a primary economic activity in rural areas. In line with this strategy, the Accelerated, and Shared Growth Initiative for South Africa (AsgiSA) initiatives targeted among others, activities that can contribute significantly to employment creation. This brought about changes in the agricultural sector, particularly around support for smallholder production (The Presidency, 2008). However, small-scale farmers continue to live in poverty due to limited opportunities of rural economy that fail to create and sustain growth (Mudhara, 2010; Fan, Brzeska, Keyzer, & Halsema, 2013). Hence a call for agricultural transformation.



In the literature, there exists a wide range of concepts and approaches for the smallholder development. Explicit attention is given to commercialisation of production systems of the smallholders. Thus, through the process of commercialisation, smallholders have an opportunity to upgrade and diversify their production systems, grow from self-sufficient agriculture and base their production decisions on changing market opportunities (Fan, *et al.*, 2013).

While the argument is so clear that market participation can achieve greater welfare gains, poor market participation can as well translate in no meaningful gains for smallholders (Olawande & Mathenge, 2012). Some developing countries like Central Kenya had long adopted commercialisation as a pathway for welfare improvements. In Kenya, a commercial specialisation scheme was established and in the incomes of households that participated in the scheme increased significantly higher than incomes of other farmers (Dorsey, 1999). In the South Nyanza District, increasing incomes were seen in farmers who switched from the production of staple crops to cash crops like sugarcane (Kennedy & Cogill, 1987).

Achieving socioeconomic welfare also has its own challenges. A number of studies in Africa identified a number of constraints to achieving welfare gains among the smallholder farmers. In Nigeria, Ademiluyi (2014) explored the smallholders in Plateau State and found that farmers' demographics such as family size had greater negative impacts in the household achieving better living. This implies that the larger the family is, the more the food supplies are required to feed the family. This means that farmers may have little or surpluses to sell. Ademiluyi (2014), suggest that families should be encouraged to use birth control especially among the younger farmers. This would help in maintaining smaller sized families if and while focus more on improving the welfare. However, if farmers are older and they have sufficient education levels, they are more likely to achieve the greatest welfare gains.

In Ghana, Yakubu (2012) examined the livelihood strategies the smallholders employ in achieving subjective wellbeing. Yakubu (2012) discovered that the livelihoods of subsistence farmers in the Northern region of Nigeria, were characterised by poor income and they were deprived a number of basic services such as health care and access to quality education. As a result, farmers were completely dissatisfied with their life situations. This implies that though the farmers can use their different trying to make a better living for themselves, without a proper the delivery of basic services, it is almost impossible to improve welfare.

In Uganda, Bashaasha, Kidoido, and Hansen (2006) used survey data to establish whether there was a relationship between household wellbeing and the determinants of poverty. An ordered logistic regression model was used. Their findings revealed that mostly men who owned at least five acreages of land and have other sources of income other than agricultural income, were more likely to enjoy their wellbeing above any given level. However, like in Nigeria, the size of the household was found to have adverse effects on the wellbeing of households. The authors recommended expansion of the community based development programmes and empowerment of the rural people with investments in educational levels.

Smale and Mason (2014) in Zambia examined the relationship between the indicators of economic wellbeing and production. Their findings suggested a positive relationship between the types of production inputs. For example, they found that using maize hybrids results in relatively high yields, which means high surplus and potential for market participation. Eventually household income is increased and welfare levels are improved. In Kasulu District in Tanzania, Msuta and Urassa (2015) assessed farmers' perception of farmer organisations and their contributions towards farm households' well-being.

Msuta and Urassa (2015) found that farmers, who were members of farmer organizations, had a relatively higher income compared to farmers who were not members. Because organizations have proved to have ability to overcome the market challenges, they recommended that farmers should be encouraged to form or join farmers organized groups.

Osmani, Islam, Ghosh, and Hossain (2014) examined welfare of smallholder farmers at different levels of commercialization. The study covered different developing countries like Kenya, the Gambia, Rwanda, the Philippines, and Guatemala. The study used one-way ANOVA analysis. It was found that a higher degree of commercialisation was associated with better welfare outcomes. Meaning that farmers, whose production is market-oriented, have higher marketable surplus. Then the probability of market participation is high, which results in higher incomes. Higher incomes also have a positive influence in the demand of more non-agricultural good and services. It was therefore, recommended that institutions should work together to encourage smallholders by providing the financial and technical support such as input subsidy, credit facilities and relevant trainings.

Sinyolo, Mudhara, and Wale (2014) in KwaZulu Natal South Africa, carried out the study to evaluate the impact of the Tugela Ferry irrigation scheme on welfare of households in the area. Two methods namely; the treatment effect procedure and the propensity score matching (PSM) were used to determine the effects. The treatment effect procedure

affected the Kernel and nearest neighbour matching techniques. According to the findings, both techniques revealed significant improvements in the welfare of smallholder farmers. The matching methods revealed that irrigation farming had increased the consumption expenditure of the irrigators with about R2 170 of cash income.

The PSM results also confirmed that irrigation farming has great and positive impacts on expenditure. However, PSM results revealed a slightly lower impact than the matching methods. However, Sinyolo *et al.* (2014) is sceptic doubts about the smallholders' abilities to reduce poverty. This author claimed that many of the smallholders in the Tugela area are poor. Therefore, the findings contradicts the observable conditions of the farmers. However, the authors urged that this should not be construed as a failure of irrigation schemes. Rather a call for policy intervention with an all-inclusive strategy to accommodate the strategies the rural smallholder use.

Moyo (2016) examined the contribution of irrigation farming on incomes and food security of smallholders in Mopani District, Limpopo Province. The treatment effects method was used. The findings revealed that smallholders who are irrigation scheme members, had their household income significantly increased by 27 percent while income of the independent irrigators increased by 50 percent. However, Moyo (2016) emphasized that these farmers had a strong capital base, meaning they are well equipped in terms of livelihood assets and resources than the non-irrigators. This implies that, farmers in Mopani District have realized the substantial welfare benefits from irrigation farming.

Home gardeners, on the other hand, reflected in significant income from farming because they relied the most on salaries and wages for more than 60 percent of their household income. PSM, on the other hand, revealed that irrigators did not only have 54 percent significantly higher household income than their non-irrigating counterparts did but they were even more food-secure. Moyo (2016) then suggests further enhancement and support for independent irrigation farming, encourage women to participate in irrigation farming, and the effectiveness of farmer's association membership to allow more farmers to participate in irrigation farming.

Sambo (2014) examined the impacts the irrigation schemes in Greater Giyani, Greater Tzaneen and Ba - Phalaborwa municipalities has had in creating jobs in the areas. According to the study, the schemes had planned to create 42 permanent job opportunities per scheme. The findings revealed that the actual jobs the irrigation schemes had created were much more than it was anticipated. In the Mabunda irrigation scheme, 65 permanent jobs and 395 temporary jobs were created. In Mariveni, 86 permanent jobs and 197 temporary jobs were created, while Seloane irrigation created about 74 permanent jobs and 55 temporary jobs. The study recommended although the schemes had reported so much success, they require financial support to help farmer acquire their own farm equipment such as tractors, trailers, and trucks, this will also help reduce spoilage of crops.

In the Eastern Cape, at the Zanyokwe Irrigation Scheme, the Best Management Practices (BMP) and technologies were implemented as the means to revive and improve the performance of the scheme. The focus of the BMP team were to encourage entrepreneurship among the farmers so that farmers treats farming as a business by focusing on the crops with the highest returns. Thereafter, Tshuma and Monde (2014) carried out an assessment to determine the changes especially in the wellbeing of farmers in Zanyokwe Irrigation Scheme. The study employed the socio-economic impact assessment (SEIA) method for the assessment. In their findings, they identified a number of significant changes. Firstly, there were changes in the cropping pattern of the scheme. According to the findings, farmers' started shifting from staple crop production (maize) and heightened the production of butternut (cash crop). This can be shown by the fact that before implementing the BMP, there was only 40 percent of farmers producing butternut compared to more than 75 percent after the BMP was introduced.

Secondly, there were improvements in household incomes. Based on the findings, the average income (adult equivalent) per household increased from R593.24 before the BMP, to R1 439.16 after the BMP. In general, agriculture contributed 81 percent of household income, compared to 71% before the BMP. Lastly, there were improvements

in the degree the land was used. As a result, 87 percent of the farmers indicated that they were more food secure than they were before the implementation of the BMP. Based on the findings, the authors, therefore, emphasize that adoption of irrigation alone is not enough, but if farmers are trained in BMP like the Zanyokwe farmer, greater socio-economic benefits are evident.

Magqibelo (2016) also evaluated the impact of the Melani irrigation scheme on livelihoods of its members. Melani irrigation is located in the Melani in the Raymond Mhlaba Municipality. The used a multiple linear regression analysis to compare the performance outcomes (based on income) of the irrigators and non-irrigators. The study revealed no significant difference in the incomes of the irrigators and non-irrigators. This implies that those farmers operating under the irrigated plots were not better than those under the rain fed production. In general, the scheme has not brought any significant changes not only on the participating members but also even to the community as a whole, not in terms of incomes or job creation.



In the recent work of Avuletey (2017), the impact of irrigation farming on the welfare of the smallholders in the Qamata area was assessed. The propensity score matching (PSM) analyses along with the matching methods were used to estimate the impacts. The average treated estimation (ATT) results for NNM and KM revealed that irrigators positively and significantly increased their crop income by R11138.72 and R11188.75 more than the non-irrigators did. Avuletey (2017) concluded that the adoption of irrigation farming does reduce poverty and improve the wellbeing of the smallholders through increased income.

### **3.7.1 Overview of literature on welfare impact**

The objective of development is to advance the socioeconomic well-being of the beneficiaries of the interventions (Tshuma & Monde, 2014). Access to smallholder irrigation farming and participation in output markets should play a significant role in improving the rural livelihoods and welfare of farming households. This relationship have

received significant attention across the continent and there are arguments that smallholder commercialization is by itself not means to an end for farmers, but a pathway to welfare goals (Gutu, 2016). Smallholders transform as they their production shift from subsistence staple production to cash crop production (Nwafor, 2015). This according to Gutu (2016) usually involve risks associated with market price and yield fluctuations. This is because commercialization is associated with specialization. Meaning that production is becoming more specialized in specific cash crops and farmers, gradually lose advantages associated with diversification of crops. This in actual sense is problematic especially for the resources poor farmers because the relationship between commercialization and specialization is not always linear. Specialization must be based on the farmers' comparative advantage. Rural farmers are poor and their productivity is low (Mujuru & Obi, 2020), this implies that where productivity is low, incentives for better and quality standards of living are also low. It therefore, also mean that welfare outcomes are low. What is clear is that, commercialization may not always yield the higher returns but because of the losses from diversification, commercialization can sometimes yield welfare losses (Boka, 2017).



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The rationale behind commercialization of smallholders is that increasing the ability of smallholder farmers to produce high valued crops increases opportunities for them to generate high income, which also gives them greater access to other household consumption items. However, with limited evidence of the outcomes of market participation, policy is deprived of feedback on the specific areas for intervention to achieve the primary goals of development and poverty reduction. This is important for policy that built on markets and commercialisation as a means for making the lives of the poor farmers better through its multiplier. This type of analysis is even scanty in the Eastern Cape Province mainly because the Province's most dominant agricultural activity and a significant measure of rural wealth have been livestock rearing. In view of the foregoing considerations, including some assertions in literature indicating that despite the numerous government effort in improving the smallholder sector, little or no improvements have yet been realised in the welfare of the rural smallholder households (kibirige, 2013) and many others. It would therefore, be interesting to know and have

some measurable evidence as to whether markets and commercialisation has brought about any changes in the welfare of the smallholders. This will ensure that efforts towards the fight against poverty are being achieved or not (Tshuma & Monde, 2012).

### **3.8 Role of Irrigation in smallholder agriculture**

It is hardly possible for resource poor smallholder farmers to increase production of commercial crops and achieve sustainable poverty alleviation without irrigation, as irrigation technologies brings a range of changes in production and value through innovative choices and intensification of cropping (Gidi, 2013). Defined more formally in Obi (2012), irrigation is the

*“Artificial application of water to land or soil for clearly defined purposes, for instance in landscaping and re-vegetation scheme”.*

Small-scale irrigation schemes has benefits that include;

- iii) low cost of investment
- iv) They are easy to maintain
- v) Users have can control the amount of water they need
- vi) It has different types that can possibly supply water to remote rural areas
- vii) Small-scale irrigation requires very little managerial capabilities

There is strong evidence in Africa and Asia that many benefits accrue to farmers who invest in irrigation technologies (Avuletey, 2017). According to Lipton and Litchfield (2003), the first direct impact of irrigation can clearly be seen on the yields. Holding prices constant, irrigation has a potential to boosts total farm output and enhance farm incomes. Hussain and Hanjra (2004), Pundo (2005) and Hagos, Makombe, Namara, & Awulachew (2009), attributed this observation to the fact that irrigation reduces crop loss they may occur as a result of irregular, unreliable or insufficient rainwater supply. Moreover, increased irrigation is likely to causes a shift in cropping seasons and patterns and allow multiple cropping, and variety of crops to be grown (Kimsum, Socheth, & Santos, 2011),

Secondly, irrigation permits multiple cropping (Gidi, 2013), which results in as much harvest as possible from the little resources the farmer has including land. Irrigation also allows production throughout the year but this is depend on the efficient and effective use of the limited resources (Hagos *et al.*, 2009).

Providing adequate and timely water in crop production has also been found to have a possibility of allowing changes in cropping patterns. In Ethiopia and some parts of Asia and Africa, farmers have reported success in the production of cash crop after the introduction of irrigation technology (Hagos, *et al.*, 2009).

South Africa as a developing country has learned from the international experience of countries like the North Africa and the Middle East and Eastern Asia and the Pacific, and that greatly reduced poverty due to the intensified irrigation systems. In Nepal, employment in the agricultural sector increased by 25 percent as a result of the irrigation projects and production increased by over 300 percent and income by over 600 percent (Lipton & Litchfield., 2003).



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South Africa had therefore initiated the irrigation innovations throughout the country but focusing more on establishing and providing a boost for smallholder farmers in the former homelands. To ensure a high rate of adoption, the government funded the implementation process of the irrigation schemes and supplied inputs as well (Kodua-Agyekum, 2009; Van Averbek, Denison, & Mnkeni, 2011).

In the Eastern Cape Province, a number of schemes were set up in the former homelands during the 1960s and 1970s (Sishuta, 2005 & Kodua-Agyekum, 2009). To this day, many of these schemes have not matched the international experience (Kibirige, Sighn & Rugube, 2019). Mainly because, when the irrigation schemes were established, lesser consideration was given to commercializing the smallholders. This jeopardized their entrepreneurial abilities as farming enterprises including the improvements in the livelihoods of the black communities (Sishuta, 2005). For example, at the Qamata area

and the surrounding communities, it can confidently be said that the scheme has not contributed much to the society through employment and food security. According to Kibirige, *et al.*, (2019), unemployment has reached 85 percent in Qamata and 76 percent of its households still suffer severe poverty levels. Around the Tyefu area of the Tyefu irrigation scheme, in Peddi area, about 78 percent of the population was unemployed and almost 80 percent are living below the poverty line (Kibirige, *et al.*, 2019).

### **3.9 Collective Action: Cooperatives**

Improving smallholders to market-oriented farming requires close relationships with processors, traders, and retailers. A cooperative is therefore an important means through which producers have access to markets. Cooperatives are a great source of as credit, inputs, technology, information, and services (Birthal & Joshi, 2007). This is an organisation or group of people who come together and act collectively in pursuit of members' perceived common goal for the development of needy, especially the underprivileged to benefit either as individuals or as a group (Kumar, Wankhede, & Gena, 2015).



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*“A cooperative is an autonomous association of persons united voluntarily to meet their common economic, social, and cultural needs and aspirations through a jointly-owned and democratically-controlled enterprise” (The International Co-operative Alliance, 2007).*

In South Africa, cooperatives had long existed and have been successful in not only mobilizing and integrating the rural people who are practically excluded socially, economically and politically from the benefits of development (Dyalvane, 2015). From its inception in South Africa, the agricultural cooperative was initiated for the crucial role of addressing farmer's challenges of the vulnerable, marginalised groups and the resource constrained smallholder farmers (Dube, 2016; DAFF, 2012). A cooperative model has been a platform where the smallholders collectively bring their resources together and support each other in joint production and/or supply of inputs. For example, agricultural

inputs, agricultural marketing and distribution of other services, which the government and private sectors has failed to deliver (Dyalvane, 2015).

A cooperative movement has been able to bring the poor especially small-scale farmers into the mainstream economy by having their voices heard in addition to improving their daily working/farming and living conditions (Department of Trade and Industry, (DTI) 2012). Because of their democratic nature, cooperatives organisations offer a platform for its members to gain control over productive activities. The collectiveness bestowed in them offers them an edge to overcome market challenges, gain bargaining power in their market exchanges, and benefit from reduced transaction costs (Chambo, 2009).

Ortmann and King (2007) carried out a survey to investigate among the smallholders, their reasons for participating in cooperative and analysed whether the model has a potential in facilitating access to markets. Presented below in Table 3.3 are the participation in or establishment of the smallholder cooperatives. Although the reasons were specifically applicable to farmers in Kwazulu-Natal, the same reasons are seen to emerge even in the Eastern Cape Province.



**Table 3.3 Reasons for Formation of Small-scale Cooperatives**

Reasons for initial formation of agricultural cooperatives	(Yes / No / Uncertain)
Poverty	Yes
Market failure (costly information, transaction costs)	Yes
Provide missing services (input and/or marketing)	Yes
Drive for self-help	Yes
Operate at cost	Yes
Improve farmers' (members') income	Yes
Enhance bargaining strength	Yes
Reduce transaction costs with traders	Yes
Assure input supplies and/or product markets	Yes
Coordinate flow of input supplies and farm products	Yes
Community development	Yes
Support of government	Yes
Strength of community leadership, motivation	Uncertain
Benefit from economies of size (in providing inputs/marketing services)	Uncertain
Reduce opportunistic behaviour	No (not at this stage)

**Source: Ortmann and King (2007)**

### 3.9.1 The successful contribution of the cooperative model

In the Eastern Cape, there have been numerous reports on the performance and contribution of cooperative to the lives of farmers and the communities at large. In 2012, the National Agricultural Cooperatives Indaba reported among others the progress of one community based cooperative in the Mbashe local municipality, Zamani Ward 11 Cooperative. The report indicated that 100 unemployed members from the 10 villages around the community initiated the formation of the cooperative. These community members responded to the call by government, which at the time was encouraging people to practice and implement the cooperative model to create jobs and fight poverty. The members devoted themselves and ventured into the production of maize, vegetables,

poultry, forest, beef, essential oils, and biofuels. The cooperative secured funding in 2008, which was used to intensify production and enabled the cooperative to secure market with Mthatha Fresh Produce Market and the broiler birds were sold across the community by members. From its operations, the cooperative has secured 9 permanent jobs and 81 temporary employment, it provides income to at least 10 members of communities in each of the 10 villages constituting ward 11 of Mbashe local municipality.

Nonetheless, while the role of cooperatives cannot be overemphasized in village-level marketing, the concern is for enhancing smallholder's cooperative operations to enable them to engage in the functioning agricultural markets while they contribute to supply chain efficiencies. In the Province, even cooperatives are still on the periphery of access to markets. It is approximated that 36 percent of cooperatives still have problems with access to the market for their products. Generally, only less than 20 percent of cooperatives have a market in government departments and about 38 percent of the market is offered by the private market while the rest of the market is from trade among or between cooperatives.



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### **3.10 Summary of the Chapter**

Poverty persists in South Africa despite efforts to eliminate it. Poverty is more prevalent in rural areas especially in the former homelands than anywhere else in the country and being poor in South Africa is likely being black, being alienated from the economic activities, being food insecure, living in mostly unplanned and poorly serviced crowded homes where people use unsafe and inefficient forms of energy. The Eastern Cape province is was identified as the second poorest and most food-insecure province in South Africa. When their livelihoods sources were explored, literature showed that the rural households diversify their source, although agriculture the rural poor source their livelihoods from agriculture, social grant and remittance remain the prominent sources of income. The challenge to the South African government is how rural residents can be assisted in establishing viable rural livelihoods.

Smallholder agriculture has a significant role in reducing poverty and improving the livelihoods of rural households. However, this is only possible if farmers their environment is enabling. Smallholder are resource poor and they face many challenges from access to land to production equipment, and market access. If supported with appropriately resources, smallholder agriculture has the potential to effectively contribute to food security, boost rural economic growth through the creation of jobs and liberation of the marginalised groups. Literature has shown that transformation of the sector is a process and farmers are require to change and shift from their traditional ways of doing things and adopt the advanced mechanisms that improve productivity. It is clear that if productivities of the smallholders are low, market participation is not possible because farmers care the most about food supplies. To boost productivity, adopting irrigation systems and participation in farmer organisations has proven to have significant outcomes.

There is enough evidence that the South African government had since made efforts to support the sectors through finance, mechanisms and management practices. For example, a number of irrigation scheme were established throughout the country and in the Eastern Cape. Many of these schemes were revitalised after they were abandoned and government still took charge over the cost of investments and supported with inputs. However, the government efforts have not produced significant outcomes. Many schemes are still struggling with and are not very competitive, while some are abandoned or not effectively in operation. In terms of livelihoods, rural households are still characterised by severe poverty, low productivity and no production. This has resulted in slow transition from being purely subsistence to specialisation in cash crops. The review of literature indicated that smallholders lack motivation and entrepreneurial skills, hence the sluggish progress in their transformation. According to literature, a lesson can be learnt from developed and urbanized societies found in Latin America and much of Europe and Central Asia, where there has been evidence of the substantial impacts from small-scale farming where jobs have been created and livelihoods and wellbeing are improved.

## CHAPTER 4

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# RESEARCH METHODS AND TECHNIQUES FOR ESTIMATION

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### 4.1 Introduction

The chapter presents the outline of the research design and methodology employed and the procedures followed to collect and analyse the data. The chapter is divided into eight sections. Following the introduction section 4.1, section 4.2 presents the study research design, which includes considerations for site selection and description of the study area. Section 4.3 presents the methods and section 4.4 provides the conceptual framework of the study. In section 4.5, the tools and techniques for data analysis were discussed and the variables were described in section 4.6. In section 4.7, the procedures for evaluation of welfare were discussed. Section 4.8 summarises the chapter.



### 4.2 Research Design

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The research design is a plan for the study, intended to provide an appropriate framework determining how the relevant information for the study was obtained (Jilcha, 2019). The research design plan involves a number of steps such as the selection of the research sites, deciding on the procedures for data collection to provide answers to the research question(s) and deciding on the techniques for data analysis (MacMillan & Schumacher, 2001).

#### 4.2.1 Site selection

The former Ciskei and former Transkei in the Eastern Cape Province are the homes of government-supported irrigation schemes that are under the rehabilitation programme and several other privately owned and managed irrigation schemes (Kibirige, 2013). However, most of the privately owned irrigation schemes were advanced and were already participating in international markets (Obi, 2011). For the small-scale mostly black

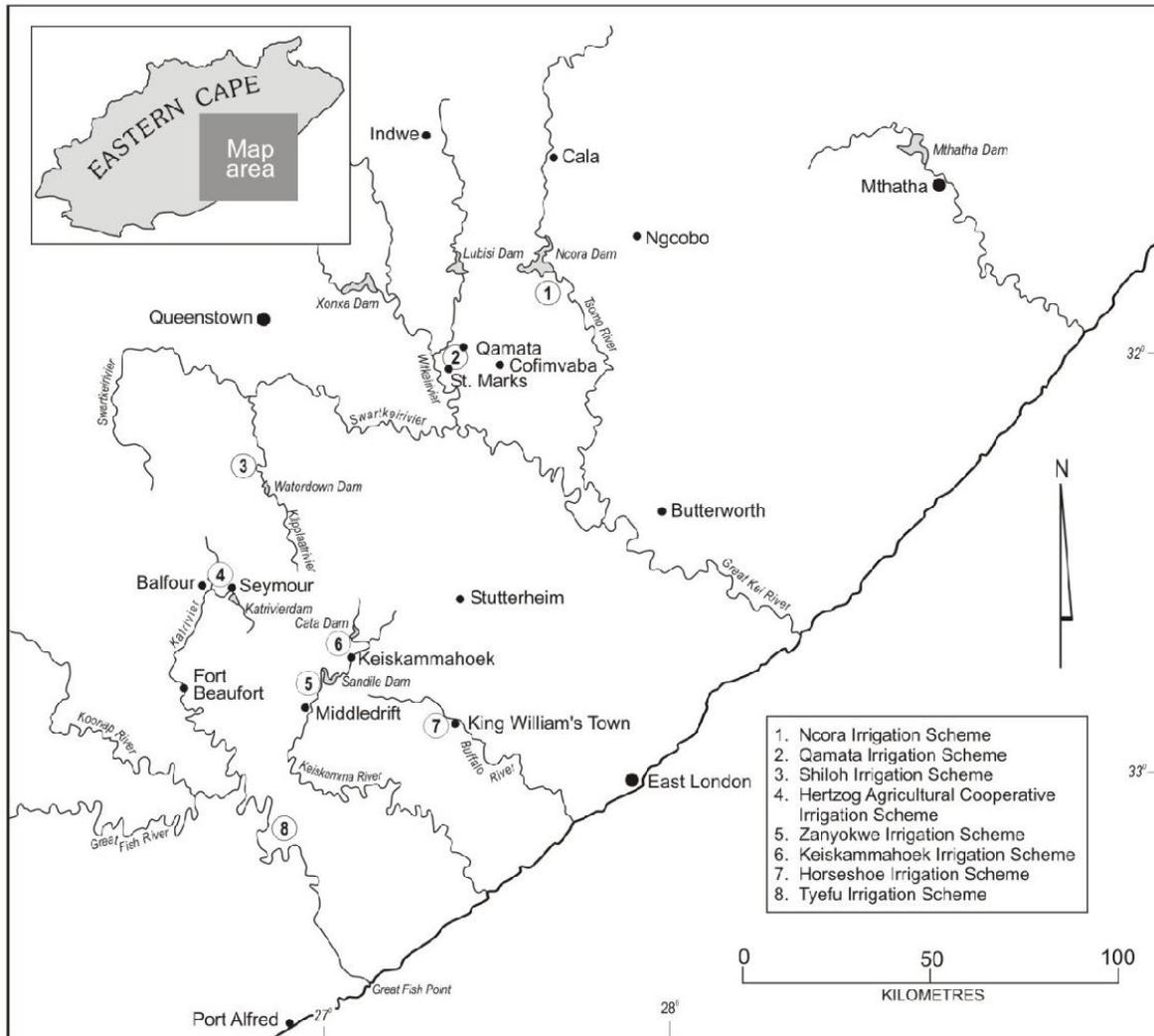
managed schemes, the transition of the new democratic government presented an opportunity for irrigation schemes operating at small-scale to contribute to the provisional, national, regional and global goals of food security and poverty alleviation (Avuletey, 2017). Below is Figure 4.1 showing the irrigation schemes in the Eastern Cape Province.

The eight (8) small-scale irrigation schemes; Ncora, Qamata, Shiloh, Hertzog, Zanyokwe, Keiskamahoe, Horseshoe and Teyfu Irrigation Scheme were established as part of the Betterment Programme (Van Averbek & Mohamed, 2006; Obi, 2011; Obi, 2012). These schemes received support from the government towards the revitalization and were supported with R25 million towards infrastructure improvements, improve productivity to fight food insecurity and reduce widespread poverty within these communities (Kibirige, 2013).

Among these small-scale schemes, the Qamata irrigation scheme in Transkei, Zanyokwe and Tyefu irrigation schemes in Ciskei were selected for the study. These schemes were selected because they are considered to be among the largest small-scale and operational irrigation schemes in the homeland areas (Kibirige, 2013).



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**Figure 4.1 Irrigation Schemes in the Eastern Cape Province**  
**Source: ECSECC (2017)**

**4.2.2 Description of the Study area**

The following section starts with a description of the Intsika-Yethu Municipality, the host of the Qamata irrigation scheme. The demographic composition, location and a brief history of Qamata irrigation scheme is presented. Subsequently, the Amahlathi local municipality where the Zanyokwe irrigation scheme is located and the Ngqushwa local municipality where Tyefu irrigation scheme is located are described.

#### **4.3.1.1 Intsika Yethu Local Municipality**

Intsika Yethu Local Municipality is located in the Chris Hani District. It has two main towns, which are Cofimvaba and Tsomo. Geographically, Intsika Yethu municipality is situated in the Highveld part of the Eastern Cape occupied with hills from which flows the Lubisi, Xonxa, Ncora and Tsojana rivers (Gidi, 2013). It is from these rivers that water for irrigation is drawn. The municipality has the unpredictable weather patterns, with long hot and heavy rains in summer. It has cool dry winters with some snow on the mountain ranges (Intsika Yethu Local Municipality, 2016; Gidi, 2013).

The municipality has a total area of 2711 km<sup>2</sup>, the population of about 152 159 persons distributed across in 35 851 households, with an average household size of four persons in 2016 (ECSECC, 2017). Economically, Intsika Yethu Local Municipality's contribution to Eastern Cape Province GDP is 0.80 percent. The community sector, which include government services, is the largest contributor to the Municipal Gross Value Added (GVA) (Intsika Yethu Local Municipality, 2016). In 2016, 31.2 percent of the Intsika Yethu Municipality's working age population were actively participating in the labour market while unemployment rate was 38.6 percent. Poverty in the municipality is at its highest with about 76 percent of the municipal population's gross monthly income averaging less than R1, 500. The economic activities that mostly contribute to household income in this municipality is livestock farming but most lands in close proximity of homesteads have huge tracts of uncultivated areas (ECSECC, 2017). The municipality is faced with numerous economic and institutional challenges including the land tenure system, which is still in the control of the traditional leaders (Gidi, 2013). According to the reports, these traditional leaders tend not to allow farmers to have access to more than 1.5 ha the households have acquired from the Apartheid administration (Avuletey, 2017).

#### **4.3.1.2 Qamata Irrigation Scheme**

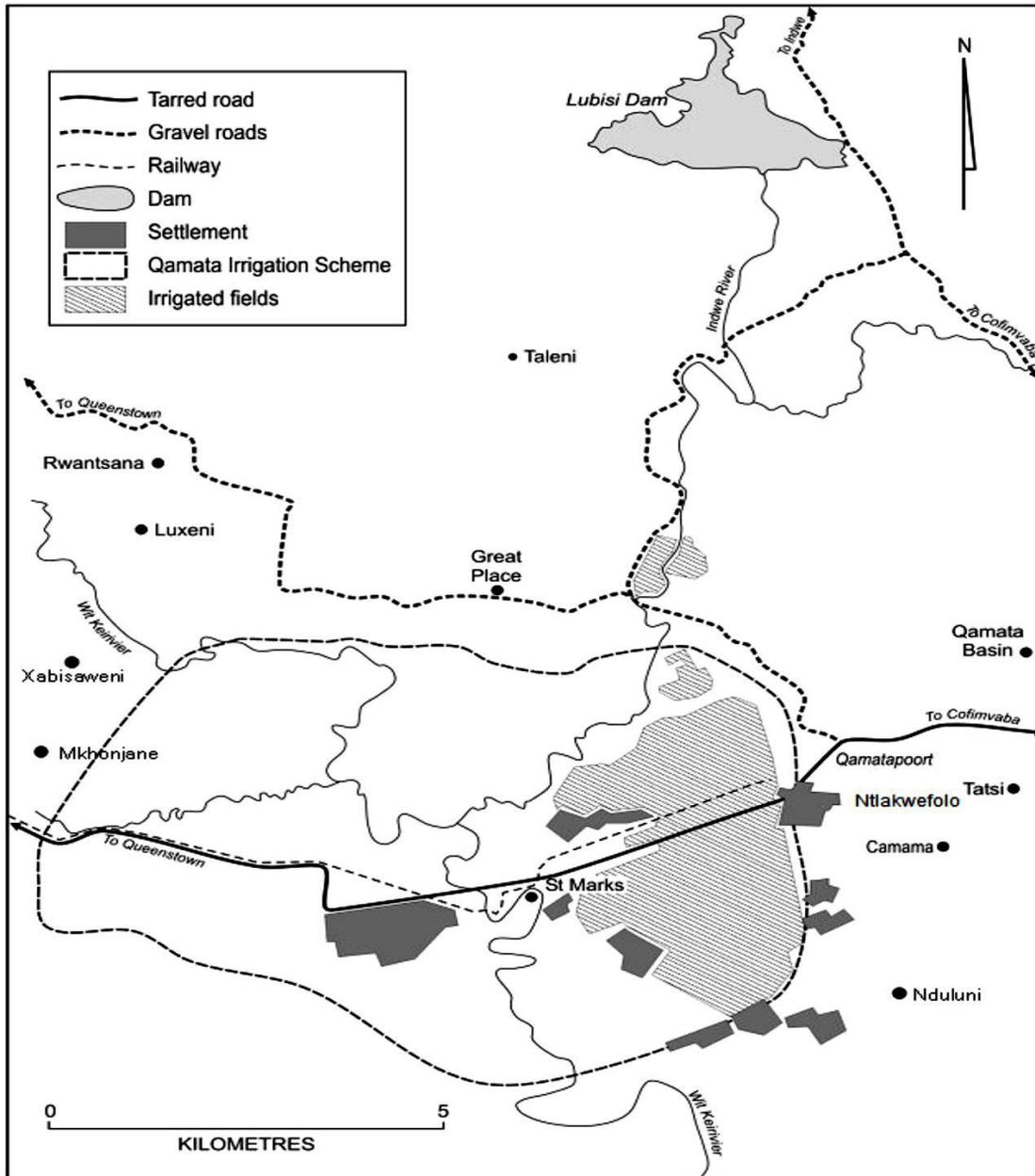
The Qamata Irrigation Scheme (QIS) is located in the subtropical high-pressure belt, at altitudes ranging between 31° 45' 30"S and 32° 00' 15"S and longitudes 27° 15' 00"E and

27° 30' 00"E (Intsika Yethu Local Municipality, 2016). The Qamata area is in the rain shadow of the Drakensberg Range, with the average temperature of approximately 12°C, in winter and 24°C to 29°C in summer. The area receives about 500mm of rainfall, which is too low to sustain agricultural production without artificially facilitated water provision, that is, irrigation (Intsika Yethu Local Municipality, 2016). However, with its topography, featuring mountains and wide valleys, it permits mechanized agricultural production and easily facilitates the efficient and low cost flow of water from the rivers to dams through the canals to the crop fields (Gidi, 2013).

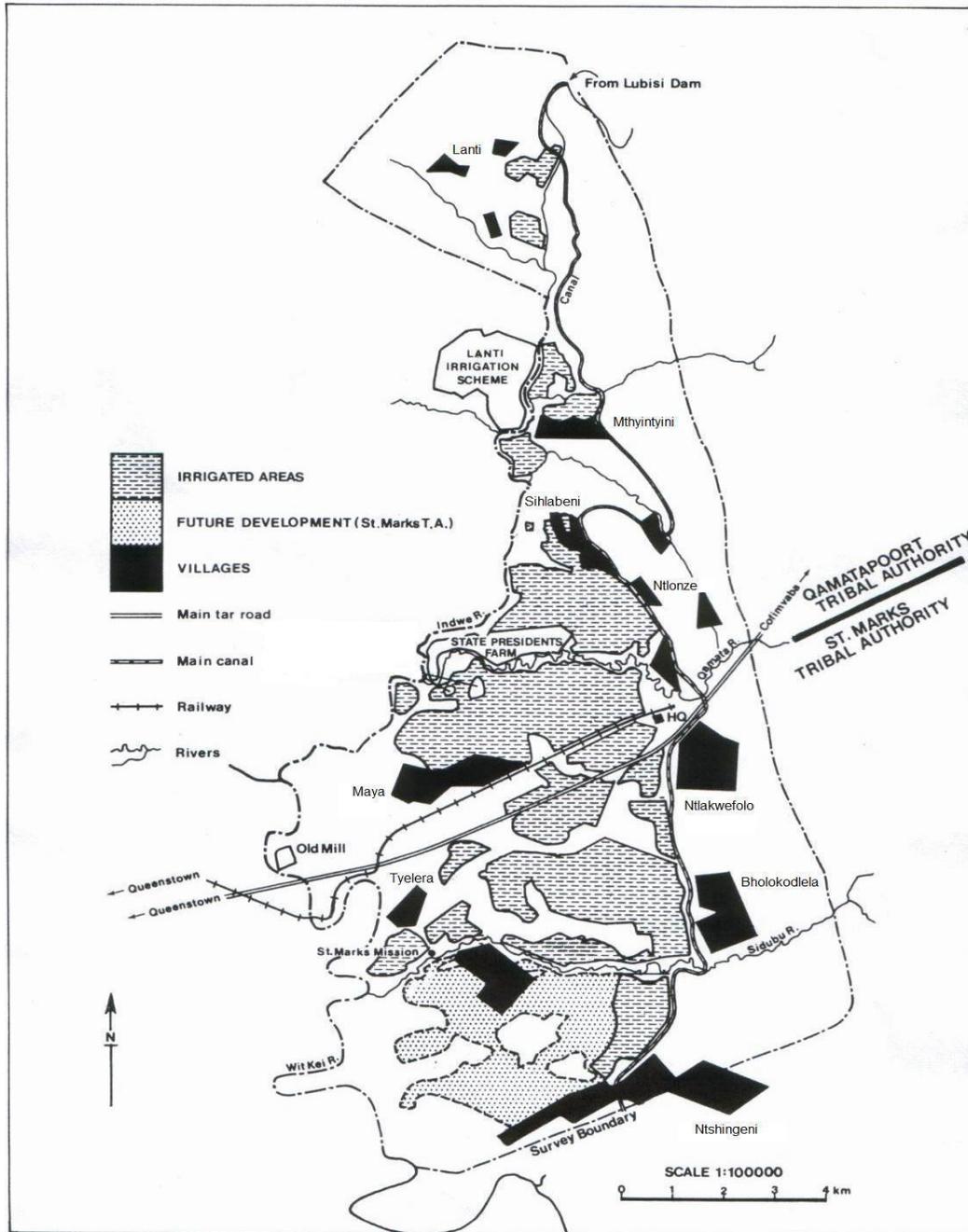
QIS's main source of irrigation water is the Lubisi and Xonxa dam, which are also supplied by the Indwe River (Kodua-Agyekum, 2009). The scheme covers the area of 2601 ha of total surface irrigated area and uses the water canal to draw irrigation water from Lubisi Dam and the Xonxa Dam (Gidi, 2013). Figures 4.1 and 4.2 show the location and layout of Qamata Irrigation Scheme.



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**Figure 4.2 Map showing Qamata Irrigation Scheme**  
**Source: Intsika-Yethu Local Municipality (2016)**



**Figure 4.3 Layout of Qamata Irrigation Scheme**  
**Source: Intsika-Yethu Local Municipality (2016)**

From its initial establishment, the QIS was divided into the individual managed food plots with the size ranging from 0.25ha to 2.5ha and fields. The sizes of the plots were mostly determined on the size of the household and every household participating in the scheme had their land holdings reassigned under the traditional leadership (Mafu, 2015). Such households can only hold the permission to occupy (PTO) not a title deed. The PTO only

allows them to farm, but cannot sell the land. Not holding a title deed means that the farmer does not make any decisions about the land, except that they only can lease it to anyone they trust (Mafu, 2015).

In addition to the small-scale plots and fields, a highly mechanized commercial farming program was initiated under which two farms, namely the Lanti Farm measuring 225 ha and the Presidential Farm measuring 77 ha were established to contribute to employment creation and generation of incomes. This was purportedly to subsidize on-farm input for food plot owners to ensure constant food supply to the households and to achieve food security goals (Kodua & Agyegum, 2009). However, the scheme has been having challenges in realizing its preset goals, especially the scheme has failed to reduce unemployment and change the living conditions and livelihoods of farmers at the scheme and the community. Avuletey (2017) cites the following as the cause of unrealized objectives:

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- i) The primary motive for distribution of plots never aimed to build the economic sustainability of the scheme and community development but it focused mainly on tribal demarcations.
  - ii) The criteria for land allocation also excluded community members with other means of survival like those who earned wages, salaries and old age pension. This somehow limited investments for such incomes in farming for increased farm production.
  - iii) Over 40 percent of the plots were abandoned because many could not afford to purchase improved seeds, fertilizers, herbicides, pesticides or meet the high costs of hiring equipment such as tractors for cultivating larger hectares.
  - iv) The political unrest in the late 1980s also led to the withdrawal of government management and operational support under TRACOR in 1994.

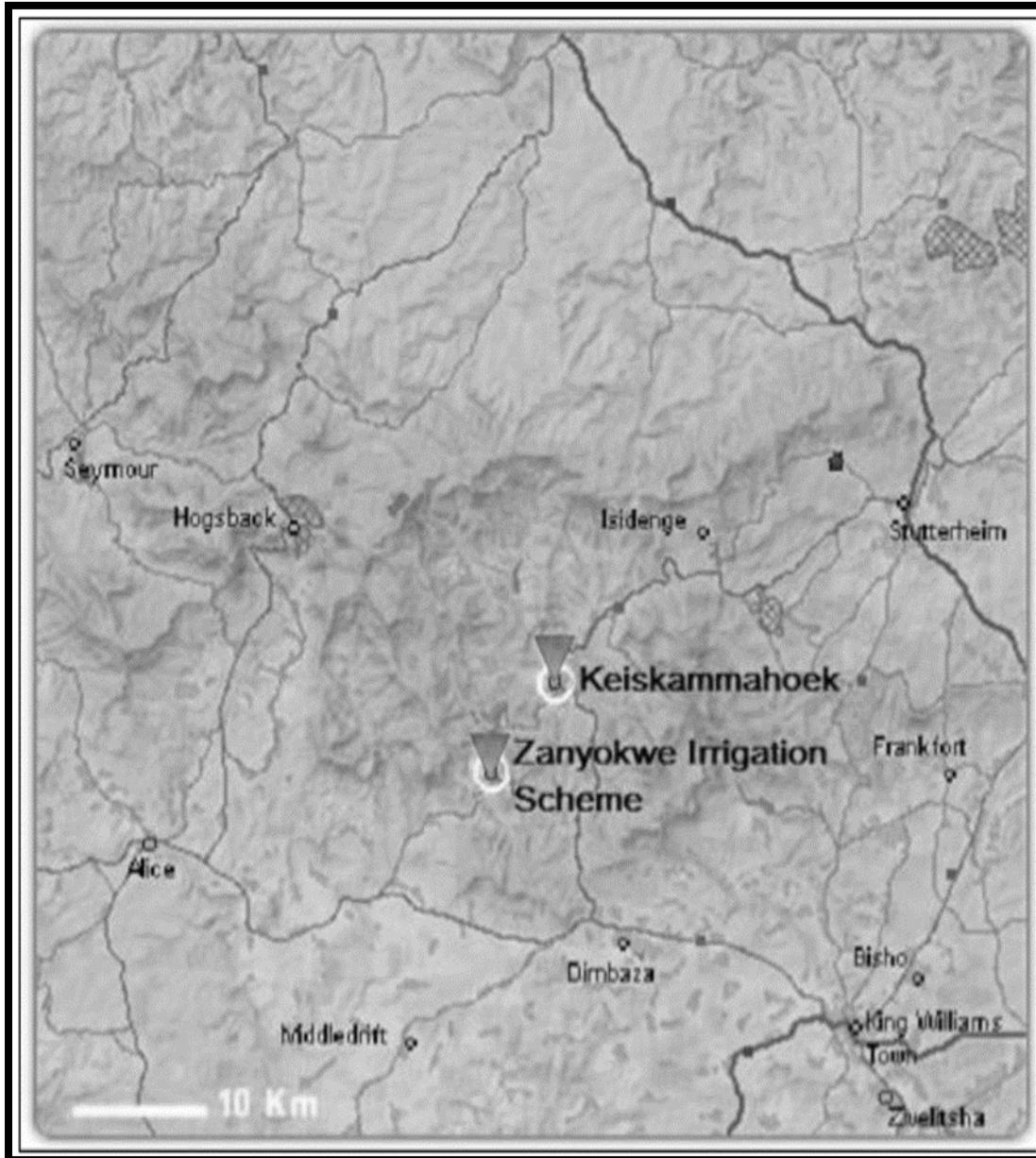
In May 2014, the District Municipality (Chris Hani) established the District mechanization center in this area. The purpose is to assist the farming communities with mechanical operations such as tractors, equipment, and amenities (Chris Hani Municipality, 2017).

#### 4.3.1.3 Amahlathi Local Municipality

The Amahlathi Municipality is one of the eight municipalities in the Amathole District Municipality of the former Ciskei homeland area. It is situated in the northern part of the district and is surrounded by six municipalities some of which are in the former Transkei homeland. To the North, it is surrounded by Lukhanji Municipality, to the North-West, it is Intsika Yethu Municipality, to the East it is Mquma and Great Kei Municipalities, while in the South and West it is bounded by the Buffalo City and Raymond Mhlaba Municipalities, respectively. The Municipality is strategically crossed by the N6 inter-provincial highway, which links it to the major national roads and rail networks. The most important towns in the municipality are Stutterheim, Cathcart, Keiskammahoek, Kei Road and parts of Tsomo. Among the eight Local municipalities, Amahlathi is home of two agriculturally significant towns, namely Keiskammahoek and Tsomo is best known for the two small-scale irrigation schemes in Keiskammahoek and Zanyokwe. Figure 4.3 shows the location of both Zanyokwe irrigation scheme and Keiskammahoek irrigation scheme.



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**Figure 4.4 Map showing Zanyokwe Location**  
**Source: Amahlathi Local Municipality (2017)**

According to the ECSECC (2017), Amahlathi houses 1.5 percent of the Amathole District Municipality and 0.2 percent of the South African population. Economically, the municipality contributes about 14.03 percent to the Amathole District Municipality GDP of R 27.9 Billion and 1.16 percent to the GDP of Eastern Cape Province (ECSECC, 2016). In 2016, it was estimated that 18.9 percent of all the households in the Amahlathi Local

Municipality lived on or below R30, 000 per annum with 65.5 percent living below the national poverty line (ECSECC, 2017).

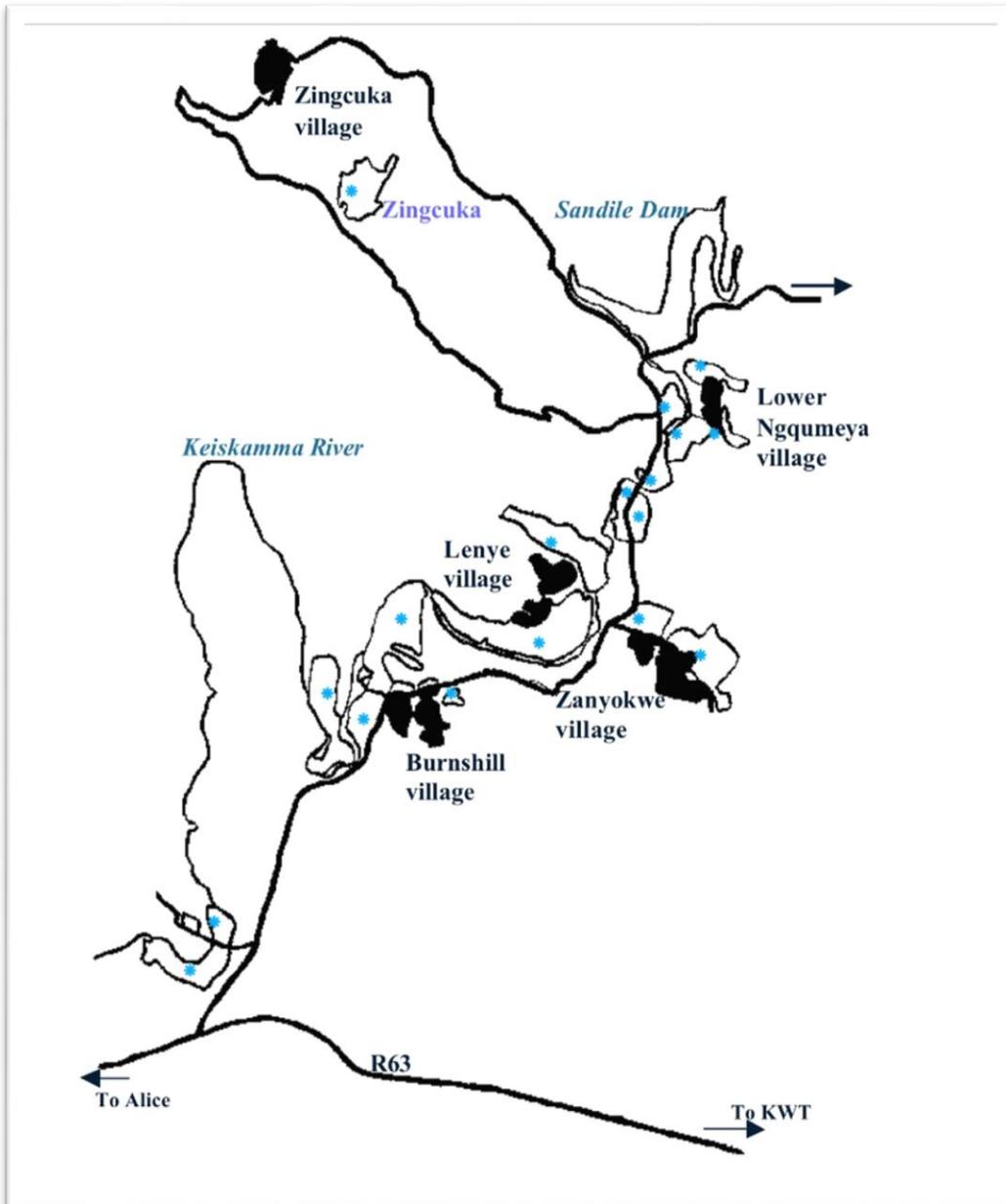
#### **4.3.1.4 Zanyokwe Irrigation Scheme**

The Zanyokwe Irrigation Scheme (ZIS) is located in the Amahlathi local municipality of the Amathole District Municipality. It is situated at the foot of the Amathole Mountains, about 30km west of King William's Town (Ngemntu, 2010). ZIS is surrounded by six villages namely; Zingcuka, Kamma-Furrow, Nqumeya, Zanyokwe, Lenye and the Burnshill villages. The scheme is one of the three largest smallholder irrigation in the upper Keiskamma and Tyume river catchments (Tshuma and Monde, 2012). The community initiated the ZIS project after the construction of Sandile dam in 1983 in the Zanyokwe village (Ntsonto, 2005). The dam remains the major source of irrigation water for the scheme (Tshuma & Monde, 2014).

The scheme approximately 635 hectares of land under the scheme but only 534ha are irrigated for crop production (Tshuma & Monde, 2012). The irrigated area consists of 64 individual small farms ranging from 0.5 to 10 hectares, which directly benefit about 402 households in the proximities of the irrigation scheme (Tshuma & Monde, 2012). The scheme also includes an additional 78“communal plots”, 42 “communal plots” in Lenye are occupied but the 36 in Burnshill were not occupied and were never irrigated (Ntsonto, 2005; Tshuma & Monde, 2014). The variety of crops such as cabbages, summer potatoes, carrots, maize, spinach, onions, butternut, green peppers and paprika are grown in the scheme (Ndlovu, 2013). Figure 4.4 depicts the Zanyokwe irrigation scheme and the villages served by the scheme.

Within the ZIS, farmers have organized themselves into legal farmer groups (Cooperatives). There are six primary cooperatives. These cooperatives have also formed a secondary cooperative, which was funded by the departments of agriculture. The secondary coop is then a vehicle for support to the primary coop. It facilitates the activities of the primary cooperatives and provides technical, financial and management

support to farmers (Ndlovu, 2013). ZIS also benefits from its proximity to the academic colleges Fort Cox Agricultural College and the University of Fort Hare. These institutions provide support to farmers on the scheme particularly in production mechanisms, proper use of inputs and implements to mention just a few (Tshuma & Monde, 2014).



**Figure 4.5 Map showing Zanyokwe Irrigation Scheme**  
Source: Amahlathi Local Municipality (2017)

#### **4.3.1.5 Ngqushwa Local Municipality**

Ngqushwa Local Municipality is in the Amathole District Municipality (Nkonki, 2013). Ngqushwa is one of the smaller municipalities in the district enclosed by the Keiskamma River and the Great Fish River. The area is mostly rural in nature and the main Cities or Towns are Hamburg, and Peddie (ECSECC, 2017). Ngqushwa local municipality area covers 2245 square kilometers, which is about 10 percent of the Amathole District Municipality (Integrated Development Plan (IDP), 2017). It accounts for a total population of 62,700, which is about 7.3 percent of the Amathole District population and about 0.1 percent of South Africa's total population in 2016. Over 95 percent of Ngqushwa local municipality's population resides in rural areas and only 5 percent reside in the urban area (ECSECC, 2017). The rural part of the Ngqushwa area like any rural area of the province lack basic essential and municipal services and the communities still depends on natural water sources like rivers and rainfall water for cooking and all other household activities.

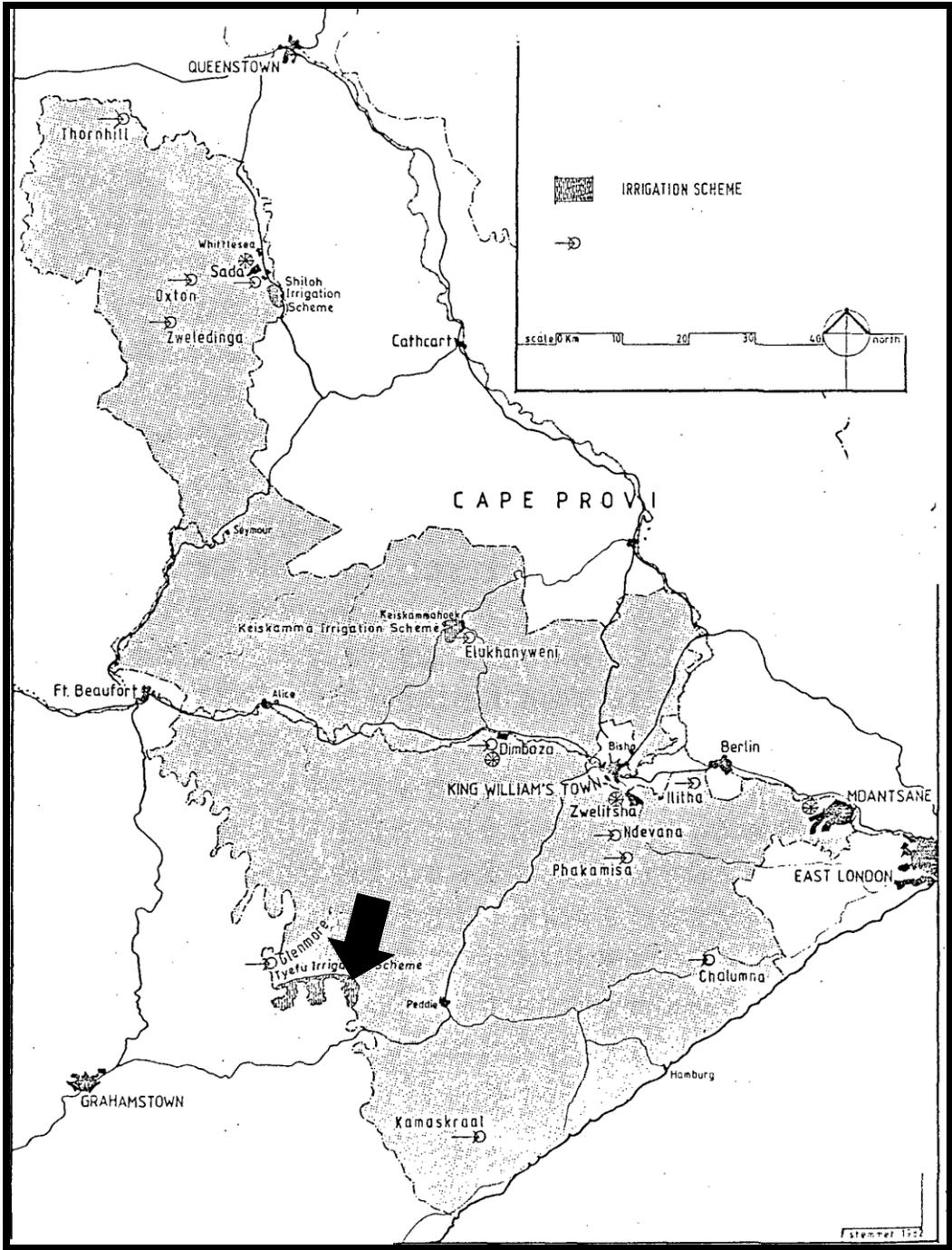
In 2016, the municipality reported the literacy rate of 72 percent, 45.2 percent of the unemployment rate and it is estimated that 19.9 percent of all the households are living on less than R30, 000 per annum. The percentage of people living in poverty is 63.1 percent with 23 percent living below the poverty line (ECSECC, 2017). The number of households in the municipality is estimated at 18 600 in 2016. These households engage in diverse activities for their livelihoods. For example, their livelihood sources include farming, managing localised small businesses, some are employed, so they earn a wage, some depend on social grants and remittances, some organise themselves into saving clubs while others engage in activities that carry no monetary value like barter trading and, payment in kind or by gifting gifts (Ndlovu, 2013).

#### **4.3.1.6 Tyefu irrigation scheme**

Tyefu Irrigation scheme is located along the lower Great Fish River, about 30 km from King Williams Town and west of Peddie in the Eastern Cape Province (Sishuta, 2005). The Scheme is divided into five sections, namely Pikoli, Ndlambe, Kaliken, Ndwayana, and

Glenmore sections. The scheme comprise 29 commercial farmers who have been allocated 4ha each while the rest of the area is divided up into 1485 food plots measuring between 0.16ha to 0.25ha each with plans to expand to 1000 hectares of irrigated land (Mujuru and Obi, 2020). However, the plan failed due of lack access to credit/finance support. Although the scheme received a meaningful support from government in 1994, the scheme still maintained the declining subsistence production (Nondumiso, 2009). The main reason was attributed to farmers' lack of cooperation and poor management including the withdrawal government support during the post-apartheid period worsened the situation (Sishuta, 2005). Figure 4.6 below shows the location of the Tyefu irrigation scheme.





**Figure 4.6 Map showing Tyefu Irrigation Scheme**  
**Source: Ngqushwa Local Municipality (2017)**

It was after the government withdrawal that the Irrigation Management Transfer (IMT) program was introduced to handover the management and maintenance of the scheme from government to the farmers (Fanadzo, Chiduza & Mnkeni, 2010). The process brought about the formation of water user associations and the development of local management institutions (Fanadzo *et al.*, 2010).

The IMT program, however, left the schemes to be run and managed by poorly skilled farmers who were mostly illiterate with low technical skills (Manona, 2005), which led to the abandonment of most irrigation plots. In 1999, only about 636 ha was being utilized. Consequently, the poor maintenance and abandonment of the equipment led to resulted infrastructure deterioration, attracted theft and vandalism (Sishuta, 2005). In 2002, the scheme was revived and four communities namely; Glenmore, Ndwayana, Ndlambe, and Pikoli were retained (Sishuta, 2005). Each retained community was allocated different sizes of total irrigated land for commercial production and a 0.25ha were allocated to individual household food plot. However, since 2011, the commercial section of the scheme lies inactive and farmers who are actively participating in the area are recognized as those farming on food plots.



#### **4.3 Research Methods**

This section presents the set the approaches followed by the study trying to find answers to the research question. Gounder (2012) identified two main research approaches, namely; qualitative research methodology and qualitative research methodology. Over the years, debate have sprouted on the appropriateness of these approaches over each other. When others believe that both qualitative and quantitative approaches can be combined to develop a shared understanding of how people are affected by phenomenon, Maxwell (2004) as cited in Daniel (2016) argue that the two methods distinctly have unique ways of gathering and analyzing data and both uses different techniques and procedures to achieve the same goal. Qualitative research is a non-numerical approach based on observations and descriptions to get the meaning, feeling and describe the situation (Goundar, 2012). It therefore, applies reasoning and uses word. Quantitative

research on the other hand uses numerical data to express, describe or examine relationships among variable. It is based on data that can be sorted, classified and can be measured in numbers, amount, intensity, or frequency (Goundar, 2012; Apuke, 2017).

Moreover, the two approaches differ in their paradigmatic approaches. A paradigm “*is a basic set of beliefs we hold and it is this belief system which guides our disciplined actions*” (Haq, 2014). Slevitch (2011) also describes it as a cognitive perspective involving a set of basic beliefs to which a particular discipline adheres. In Daniel (2016), Kuhn (1970) defined a paradigm as a set of logical assumptions about what is to be known or studied (ontology) and the ways of knowing it (epistemology), which according to Creswell (2002; 1994) guides researchers when undertaking a study. Paradigms can be determined from two different perspective, namely; from an ontological perspective and epistemology perspective. The Ontology of research is said to state the reality of how things are and tends to describe things or relationships, as they are (Guba, 1987). The epistemology of research on the other hand, is about the nature and how much is known about the phenomenon (Slevitch, 2011).



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Ontologically, qualitative approach is based on interpretivism and constructivism (Slevitch, 2011). In constructivist paradigm, it is believed that an objective reality does not exist rather multiple realities depending on one’s perception and interpretation of reality (Haq, 2014). It states that reality is socially constructed, meaning that whatever is the truth, is shaped by individuals’ interaction with the society, behavioural experiences and beliefs. In that case, reality is expected to change as it is continuously recreated. On an epistemological level, qualitative research is designed to look beyond the measurements, rather to contextualize, interpret and understand the participants’ perspective in order to understand their feelings, impressions and viewpoints. Therefore, from the subjectivist point of view, reality of the matter and its validity would depend on how people interpret or construct their realities and their interpretation (Slevitch, 2011; Guba & Lincoln, 1994).

The quantitative approach on the other hand emanates from positivism and objective research discipline. It is based on an independently existing reality that can be described

as it really is regardless of the circumstances or what individual's perception of it is. Researcher's ontological perspective quantitative approach is that the truth does exist and there is only one truth about the phenomenon being investigated. Therefore, the truth does not change, it exists regardless of researcher's interpretation of the information they got (Haq, 2014). Epistemologically, unlike in qualitative approach where the researcher identifies fully with the phenomenon being studied or the research setting. In quantitative approach, the researcher and the phenomenon of study are not interlinked. Meaning that the researcher does not identify with the researched phenomenon. Therefore, the researcher can study those being investigated without him/her influencing their responses or him/her being influenced by them (Slevitch, 2011; Guba and Lincoln, 1994).

Researchers, mostly use both approaches. However, if there is to be any validity in the findings, Easterby-Smith, Thorpe, & Lowe (1991), suggests a complete independence of the researcher from the subject being investigated. In light of the aforementioned, researcher in this study is prompted to use quantitative methods. Because the researcher was not familiar with the farmers in the study. Therefore, the research was not in any way going to have influence in the responses but report the data as is. Besides, the quantitative method was also found advantageous and favourable for the following reasons;

- It uses numeric estimates and presents results in percentages that are easier understand and interpret (Gounder, 2012). This type of data is precise, highly reliable and easily be translate into easily quantifiable charts and graphs.
- Allows for a investigation of a number of subjects (kazondovi, 2018)
- Different sources of information can be used

Furthermore, to address the key research objectives of the study: how much progress smallholders have made in the line of commercialization, the study assume the quantifiable measure and outcome. As such, quantitative methods provides the decision makers with a more precise description of the cause-and-effect relationships between variables, which mostly help to validate or nullify concepts or ideas (Haq, 2014), based

on quantitative data, in exploring policies for achieving the set goals (Connell, 2016). The quantitative research method is based on the following characteristics/assumptions;

- Reality is objective, and independent of the researcher, therefore reality can be studied objectively and be measured
- The researcher is ideally an objective observer, should remain distant and independent and not influence what is being studied.
- The values of the researcher do not interfere with, or become part of the research
- Research aim to establish the relationship between measured variables
- Scientifically test hypothesis

#### 4.3.1 Types of quantitative methods

There are three types of quantitative methods; the experimental Methods, Correlational Research and survey methods. The Experimental method is the scientific research design, which is, conducted in a controlled environment where the researcher investigates the treatment of an intervention and then measures the outcomes of the treatment. This method is often build upon technologies or technological insights (Williams, 2007).

The Correlational research or studies on the other hand examine the statistical relationship in the characteristics of two or more entities being studied. A correlation behaviour is when a change in one variable causes a corresponding change in the other (Apuke, 2017; Williams, 2007). Finally, the survey methods seeks to examine and measure the characteristics and understand the behaviour of a given population using the statistical methods (Apuke, 2017). There are two types of survey;

- i. Cross-sectional survey method which is the type of an observational study which examines the characteristics of the phenomenon at a given point in time, and
- ii. Longitudinal study is used to examine change from the repeated and continuous observation of a phenomenon (Caruana, Roman, Hernández-Sánchez, Solli, 2015).

#### **4.3.1.1 Cross-sectional Survey**

This is a cross-sectional study examining farming households at a single point in time. Cross-section study design is an observational study design enabling the researcher to determine or measures the prevalence of an outcome and allows to study the participants at a particular point in time (Mann, 2003). The advantage of using this type of design is that data are collected only once, yet multiple outcomes can be studied from the analysis of data. The collection of data through this process does not only save time but it is cheaper and also accommodates the respondents' busy schedule under the assumption that they are working in their respective farms. In this way, the design allows for minimum disruption of the on-going productive work of the respondents.

Although the cross-sectional type of design is believed to make it difficult to study or observe the change in the participants since there is no baseline data (Setiba, 2016), it, however, allows the study to examine the relationship between market participation and welfare of the smallholder farmers. This means understanding the socio-economic characteristics of each smallholder farmer that influence their market participation decision and assess their welfare effects resulting from market participation. This section presents the procedures for data type, sampling framework, data collection methods and techniques for data analysis.

#### **4.3.2 Types and sources of data**

The primary data were extracted from the survey of farming households and were used for analysis. This is the first-hand information collected from respondents. Although it can be difficult at times to obtain primary data direct from the respondents but this kind of data is more reliable, authentic and objective because it has not been published or been used for analysis elsewhere (Kabir, 2016). There is a numerous ways to obtain primary data, such as; through experiments and surveys. (i). Experiments are mostly used in medicinal and psychological studies where one collects data and under a controlled environment where the influence of all variables can easily be monitored and controlled. (ii). Survey is

a quantitative method used to examine human behaviour through their responses to a set of predetermined questions. Surveys are can be conducted where the behaviour of lager groups of individuals is examined and this can be done through a questionnaire, interviews and/observations (Ponto, 2015). A questionnaire survey can be conducted via different methods for example by telephone, mail, through electronic mail or in person. Interview is a face-to-face conversation with the respondent. While observation is about studying the behaviour of an individual without or with them knowing that, they are being observed (Kabir, 2016).

For this study, the survey was the most suitable method of data collection because it allowed the researcher close interaction with the respondents while obtain their direct responses. It was also the cheapest, quickest and more efficient way of getting reliable information from the sample.

#### **4.3.3 Sampling**



Collecting data from the entire population is often ill-advised for some variables because it can be costly and time-consuming and a different arrangement is practicable. A sample of the population is therefore, selected to represent and estimate the population responses. A sample must be representative in that it must reflect similar characteristics with the population, yet ensures responses that accurately reflect the entire population (Ponto, 2015; Kodua-Agyekum, 2009). Therefore, the study employed it fully understanding that the sample must have characteristics that are similar to with the population from which it was drawn (Magqibelo, 2016; Jari, 2009).

The first step in sampling was to correctly identify the population of interest. For this study, the population consisted of the scheme irrigators and non-scheme (independent) irrigators in rural of the Eastern Cape Province. Eight irrigation schemes Ncora, Qamata, Shiloh, Hertzog, Zanyokwe, Keiskamahoe, Horseshoe and Teyfu Irrigation Scheme located in the homelands were identified through the help of the Department of

Agriculture. These institutions assisted specifically with information regarding the location and operational status of the schemes.

#### **4.3.3.1 Sampling framework and sample size**

The multi-stage sampling procedure was then adopted for the selection of sample households for data collection. The stages included the purposive and random sampling methods. The purposive sampling was used in the first stage where the three irrigation schemes; the Qamata, Tyefu and Zanyokwe irrigation schemes were selected from the total eight schemes. The purposive selection was preferred in this research because in its characteristic it permits the researcher to be the judge of the samples that contain the most relevant characteristic and select the units that have typical attributes of the population (Flick, 2007). The selection of the Qamata, Tyefu, and Zanyokwe smallholder irrigation schemes was based on the fact that they regarded as the largest small-scale in the area, are functional when most other schemes have long been abandoned. Furthermore, these schemes produce a mix of crops (maize and vegetables) when other schemes are either producing vegetables or maize. Recalling from the review of literature, in the Eastern Cape, research is lacking on the subject of crop market participation and commercialization. Most previous studies had either singled out maize or analyzed livestock farming.

The second stage involved identifying the villages or farming communities surrounding the irrigation schemes from which the non-scheme irrigators were selected. In the Qamata area, there are ten villages, namely; Maya, Emthyintyini, Township Zwelitsha, Ngqanga, Shlahleni, Ntlakwefolo, Ntlonze, Bholokodlela, Ntshingeni, and Tyelera. There are six villages in Zanyokwe namely; Zingcuka, Kamma-Furrow, Nqumeya, Zanyokwe, Lenye, and the Burnshill villages and five villages in Tyefu area, namely Ndlambe, Pikoli, Ndwayana, Kaliken, and Glenmore.

Stage 3 involved the random selection of the respondents from the communities surrounding the respective irrigation schemes. With the help of the extension officers and

community authorities, the researcher identified the smallholder irrigators cultivating in the surroundings of the schemes. Depending on their accessibility and their availability for the interviews, a total of 172 scheme members and 38 non-scheme households were interviewed. 210 household heads who were irrigation schemes and non-scheme members were sampled. Table 4.1 below presents the distribution of the sample size by category of smallholder and the irrigation area.

**Table 4.1 Distribution of sample**

<b>Category</b>	<b>Qamata</b>	<b>Zanyokwe</b>	<b>Tyefu</b>	<b>Total</b>
Scheme Irrigators	56	64	52	<b>172</b>
Non-Scheme Irrigators	22	12	4	<b>38</b>
<b>Total</b>	<b>78</b>	<b>76</b>	<b>56</b>	<b>210</b>

**Source: Field survey (2017)**

#### **4.3.4 Data collection Methods**



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Data were collected using structured questionnaires and face-to-face interviews. The two methods are more complementary of each other rather than being competitive with each other. Face to face interviews allows the researcher or through other trained field workers to personally obtain detailed data and further probing can be done to provide rich data rather than self-administered questionnaires (Kabir, 2016). Questionnaires are more interesting and preferred to use for the following reasons (Young, 2015):

- Questionnaire development requires less skill, even less experienced researchers can easily construct it.
- Using a questionnaire can help collect large volumes of data through direct contact.
- Data collected using a questionnaire can be easily processed compared to spoken information, which may have to be recorded before analysis.
- Questionnaires are often used where behaviour and demographic information is examined.

- It is also generally quick to collect information using a questionnaire.
- Literacy is not the issue of concern especially where the researcher conducts face-to-face interviews.

Questionnaire-based survey have, however, also been criticized for a number of reasons,

- Questionnaires provide a relatively 'thin' description of target phenomena because so it is not possible to provided explanation (Young, 2016).
- Like many evaluation methods a questionnaire is administered after the event or incident, some important information may be omitted as respondents may forget some important issues.
- Respondents may be expeditious when answering questions especially when they feel like they have nothing to benefit or the questionnaire is too long.
- Respondents may deliberately hide information or wish not to reveal certain information especially if they think they will jeopardize their position. For example, they not be truthful about their financial status with the fear of being excluded from potential benefits.



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#### 4.3.5 Pre-testing of a Questionnaire

Before administering the questionnaire, it was necessary to test the questionnaire items on a small sample of respondents. This was done to;

- i) analyse whether the questionnaire addresses all the study objectives,
- ii) determine whether the questions were clear and easy, and the degree to respondents have any difficulty in understanding the questionnaire, and
- iii) Whether there are any ambiguous or biased questions.

This give the researcher an opportunity to identify and rectify errors or delete unwanted questions. For this study, the pilot testing of a questionnaire was done in Melani village located 10km from the University of Fort Hare. In the Melani village, there is a small-scale irrigation scheme operated by village members. A draft questionnaire was administered to ten participants for testing of the questionnaire and viability of the survey. The questionnaire was then revised upon reviewing the results of the pilot testing.

#### 4.3.6 Data Collection

After the pre-testing of the questionnaire, visits were made to the homes and/or groups of farmers in the Qamata, Tyefu and Zanyokwe areas, for introductions. With the help of the extension officers and the community leaders, the researcher was introduced to the farmers in the areas for the briefing of the purpose of the visit and the survey and scheduling of appointments for the interviews. The local language "Xhosa" was used to highlight to farmers the whole purpose of the survey including their rights and what was expected from them. It was important that farmers were informed of the importance of honesty in disclosing all the required information as well as their right to the confidentiality of any information disclosed. Farmers were also informed that they were not obliged to answer questions about which they felt uncomfortable. It is ethical for the researchers to keep any personal information as confidential as possible.

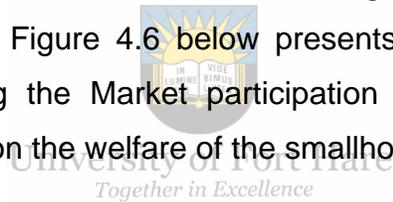


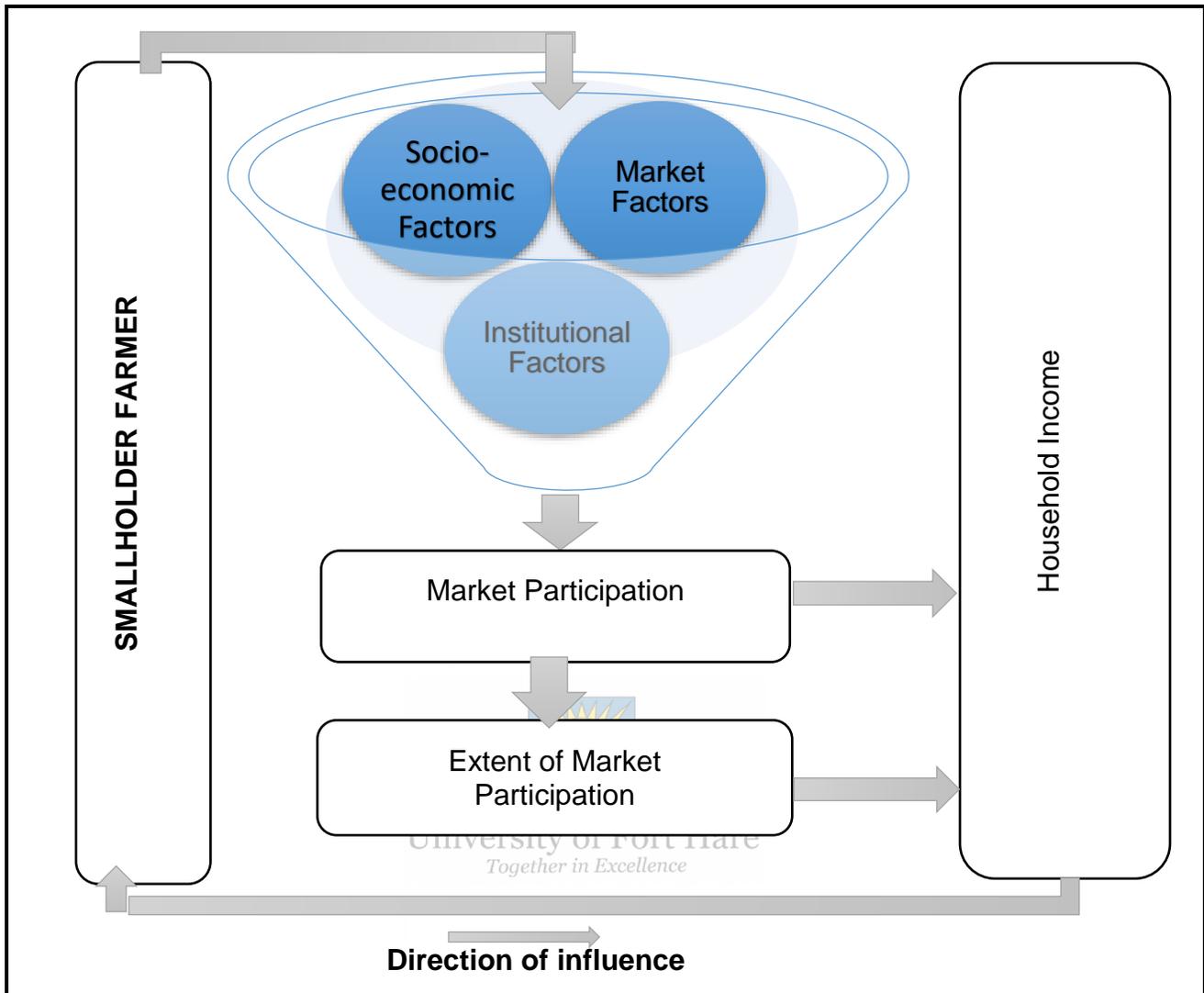
Prior experience has shown that farmers are often busy with their agricultural activities or other social responsibilities. Therefore, a follow-up call needed to be made as a reminder to the farmers before the day of the interviews. This was necessary for the interviewers to confirm the availability of the farmers. On the day of the interview, farmers were reminded again of their rights and responsibility concerning the interview. Uniformity in the questions was carefully observed to maintain the consistency and validity of the study. Interviews were done and from observation, farmers revealed as much information as they could, except that there were few complaints from farmers, indicating lack of time as they were busy, hence some were visited on their farms, which also caused a delay in the process of interview. After the administration of the questionnaire, the researcher thanked the farmers for their participation and cooperation and was promised that the findings of the study would be made available in a report that will be shared with them.

#### 4.4 Conceptual Framework

Market participation is expected to affect various aspects of smallholder households, from production to improvements in income and welfare gains (Abdullah, *et al.*, 2017). Access to markets provides farmers with an opportunity to sell their surplus output and earn better incomes which increases the purchasing power, allowing them to purchase other non-agricultural goods and, thus, enhances welfare (Burchi & De Muro, 2016).

However, participation is not a random process because farmers ought to decide to participate either in the market or not given a set of factors (Gani & Adeoti, 2011). Such factors are categorized as the socio-economic factors which include; age, education level, gender, household income, occupation, household income, market factors include; vehicle ownership, the prices of output, marketing experience, and distance to the market, and the institutional factors are access to extension service, government support services, and farmer group membership. Figure 4.6 below presents the conceptual framework that depicts the factors affecting the Market participation behavior, the extent of market participation and the impact on the welfare of the smallholder households.





**Figure 4.7 Conceptual Framework of Smallholder Market Participation**  
**Source: Author's conceptualization**

The framework in Figure 4.7 demonstrates the interrelationships of the mentioned factors with the extent of market participation and its impact on the welfare of smallholder households.

## 4.5 Analytical methods and Empirical modelling

Generally, the empirical analysis sought to measure progress in commercialization of smallholders and explored how smallholder markets influence welfare outcomes. Before this was done, it was important for the study to first understand who the sampled smallholders are through the profiling of their socio-economic characteristics. Examining the characteristics of smallholders is crucial as it helps us understand the nature of their structures and identify the important features that have influence on their market participation decisions. The descriptive statistics analysis of the socio-economic characteristics of the smallholder farmers who are household heads was used to examine their relationship with the markets. The statistical analysis used the percentage distributions, means and standard deviation. A set of mathematical and econometric equations were also used to estimate the level of the binary market participation decision of smallholder farmers.



### 4.5.1 Unit of analysis

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The required data were collected from the farming households and the respondents are either a men or women who are responsible for and actively participate in crop farming, and make the farming and marketing decisions.

### 4.5.2 Measuring the level of market participation

A composite score analysis was used to measure the level at which the smallholder farmers engaged in markets. A composite indicator is an aggregated index, which is used to integrate several variables or indicators by converting them into a single measurement or scale. The index is used to measure performance, status or progress into quantifiable targets and presents it in a format that is easily understood (Chakrabarty, 2017). Following Govereh, Jayne and Nyoro (1999) and Strasberg, Jayne, Yamano, Nyoro, Karanja and Strauss, (1999), a composite score was mathematically computed. Govereh *et al.* (1999) used a household commercialization index (HCI) to measure a household

level of commercialization. HCI is “a ratio of the gross value of all crop sales per household per year to the gross value of all crop production” (Sekyi, Abu & Nkebge, 2020). For this study, the index is computed as the level of market participation (MPI) was measured as the total value of output sold by a household  $i$  in relation to the value of all crops cultivated by a household. The index is expressed as:

$$MPI_i = \frac{y_i}{Y_i} 100 \quad (4.1)$$

Where  $y_i$  is the gross value of crop sales for household  $i$  and  $Y_i$  is the gross value of all crop production for household  $i$ .

Where,  $0 \leq MPI_i \leq 100$  (4.2)



A zero value of MPI that is,  $MPI = \text{zero}$ , is observed when a household has no surplus to sell but has excess demand on the commodity. On the other hand  $MPI = 100$  if a household sells all output. The closer the index is to 100, the more market oriented the household is. The ratio signifies change in farm household decision-making behaviour. Composite scores were generated from set of questions regarding production and market volumes. Market participation index was therefore computed as an average ranged from 0 to 1. The scores were used for the categorisation and profiling of respondents into levels of commercialization as subsistence, semi-commercialisation and commercial levels which correspond to censoring values of 0, 1 and 2 respectively.

#### 4.5.3 Theoretical model and empirical specification

The agricultural household model assumes a farmer as a producer and consumer who is often confronted by several competing goals in pursuit of a balance between the farm needs and family goals (Singh, Squire & Strauss, 1986). This creates a conflict between

the farm and family goals. For example, there is a trade-off between meeting the objectives of food self-sufficiency and income. According to Kahan (2013), when a farmer chooses to maximize income, he or she is limited by the need to secure at least the minimum quantity of food required by the family. This means that a farmer can participate in the market for profit maximization if the quantity demanded for home consumption is assured. The challenge is how the household makes decisions to meet its immediate needs while taking steps toward more sustainable, market-oriented, profit-focused farming.

This model recognizes that farmers may be faced with two decisions, that is, whether they participate or not and the decision about how much to sell. This decision is either a single decision making process or a sequential two-step procedure (Sekyi, *et al.*, 2020). The sequential process in the sense that the farmer decides whether to participate in the market or not, and if they decide to participate in markets, the subsequent decision is about the quantity of their produce to sell. Analysing the market participation decision making of the smallholders can be better understood based on the utility maximization model because although the small-scale farmers sell a portion of their output in the market, the dominant part of their production is reserved for home consumption. As indicated in Kahan (2013), it is only when the home consumption is satisfied that farmers decide to sell their surplus and this could continue until the surplus becomes the dominant portion of the total output of the household (Mathlo, 2014). In this case, the households' motive for participation in output market is to maximize a utility function that yields the highest returns from participation.

The utility function can be expressed as;

$$U_i = U_i(y_i, z_i, p_0, \mu_i) \tag{4.3}$$

Where,  $y_i$ , refers to the farmer's income,  $Z_i$  is a vector of the farmer's socio-economic characteristics and attributes of choice,  $p_0$  is a vector for non-participation and  $\mu_i$  is the stochastic error term to capture the unobservable utility components.

The farmer's decision to participate in markets is then based on the condition that;

$$U_i = U_i(y_i - P_i, z_i, \mu_i) > U_0(y_i, z_i, \mu_i) \quad (4.4)$$

That is, the farmer decides to participate if and only if the returns, utility level of satisfaction from market participation exceeds the expected level of satisfaction or return from not participating in markets with the  $n$  alternatives, that is, being autarkic after the evaluation of each of the alternatives.

The differences in the utilities cannot be observed but only the decision that the individual takes is observed. A linear expression of utility is assumed as:

$$\begin{aligned} Y_i^a &= \beta_1(X_{i1}) + \varepsilon_{i1} \\ Y_i^n &= \beta_n(X_{in}) + \varepsilon_{in} \end{aligned} \quad (4.5)$$



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Where the  $X_{in}$  represents the exogenous explanatory variables in the equation.  $Y_i^a$  is the utility associated with market participation,  $Y_i^n$  is the utility of a non-market participant and in  $\varepsilon_{in}$  are random disturbance terms for the population of buyer, seller, and autarkic households. The farmers' decision to participate in output markets can therefore be expressed as follows:

$$\begin{aligned} y_i &= 1 \text{ if } y_i^* > 0 \text{ and } 0 \text{ if } y_i^* \leq 0 \\ y^* &= x_i' a + \varepsilon_i \end{aligned} \quad (4.6)$$

Where,  $y_1^*$  is latent variable that takes the value of 1 if a household participates and 0 otherwise,  $x$  is a vector of household characteristics,  $\varepsilon$  is the normally distributed error term. In investigating the probability of participating in output market, the probability of participation is assumed to be determined by an underlying response variable that

captures the actual socioeconomic status of farmers. In this case, the underlying response variable following Greene (2003)  $M_i^*$  is defined by the regression equation:

$$MP_i^* = \sum x_i' \beta + \mu_i \quad (4.7)$$

In the equation (4.7),  $M_i^*$  is not observable, as it is a latent variable. What is observable is an event represented by a dummy variable  $DD$  defined by;

$$MP_i = \begin{cases} 1 & \text{if } M^* > 0 \\ 0 & \text{if } \textit{Otherwise} \end{cases} \quad (4.8)$$

From equation and, the following expression can be deduced;

$$Prob(MP_i = 1) = Prob(\mu_i > - \sum x_i' \beta) = 1 - F(- \sum x_i' \beta)$$

and

$$Prob(MP_i = 0 | \beta x_i') = F(- \sum x_i' \beta) \quad (4.9)$$



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Where  $F$  is the cumulative distribution function of  $u_i$ . The observed values of  $MP$  are the realization of the binomial with probability giving by equation (4.8), which varies with  $x_i'$ .

Thus the likelihood function can be written as;

$$L = \prod_{DD_i=0} F[- \sum x_i' \beta] \prod_{DD_i=1} [1 - F(- \sum x_i' \beta)] \quad (4.10)$$

Equation (4.8) can also be written as

$$L = \prod_{DD_i=1} [F(- \sum x_i' \beta)]^{1-DD_i} [1 - F(- \sum x_i' \beta)]^{DD_i} \quad (4.11)$$

The log likelihood function for the equations (4.9) and (4.10) can be written as

$$L = (\beta) = \text{Log}L(\beta) = \sum_{i=0}^n DD_i \text{Log}(1 - F(-\sum X_i' \beta)) + (1 - DD_i) \text{Log}F(-\sum X_i' \beta) \quad (4.12)$$

The functional form imposed on F in equation (4.11) depends on the assumption made about the error term ( $u_i$ ) in equation (4.8). The cumulative normal distribution and logistics distribution are quite similar, yielding same result. In this study, a Probit model with the assumption of logistic cumulative distribution function of U in F (in equation 4.9 and 4.10) is specified as;

$$1 - F(-\sum x_i' \beta) = \frac{e^{\sum x_i' \beta}}{1 + e^{\sum x_i' \beta}} \quad (4.13)$$

$$(-\sum x_i' \beta) = \frac{e^{-\sum x_i' \beta}}{1 + e^{\sum x_i' \beta}} = \frac{1}{1 - e^{\sum x_i' \beta}} \quad (4.14)$$

Where  $\beta$  is the vector parameters that reflect the effect of a change in  $x$  on probability of being food insecure. The choice of a particular form for the right hand side of the equation (4.12) leads to an empirical model. Adopting the Probit analysis, the probability that a household would participate in output market is given by the regression model;

$$\text{Prob}(MP = 1) = \frac{e^{(x_i' \beta)}}{1 + e^{(x_i' \beta)}} \quad (4.15)$$

Equation (4.8) is a logistic cumulative distribution function where;

$$\beta' X = \beta_0 + \sum \beta_i X_i + u_i \quad (4.16)$$

and  $u$ = base of natural logarithm,  $\beta_0$ = the constant term,  $\beta_i$ = the vector of coefficients,  $X_i$ =vectors of explanatory variables.

In the second stage of the analysis, the study applied the Tobit model, a hybrid of the discrete and continuous models, to investigate the level of output market participation. The Tobit model developed by Tobit (1958) is an econometric model in which the

dependent variable is censored. Following McDonald and Moffitt (1980) the model is expressed as;

$$q_i = P = \beta'X_i + \mu_i \quad \text{if } P_i^* > 0 \quad (4.17)$$

$$q_i = 0 = \beta'X_i + \mu_i \quad \text{if } P_i^* \leq 0 \quad (4.18)$$

$q_i$  is the dependent variable, it is discrete when the household is not participating and continuous when participating. The welfare indicator is  $MPI_i^*$  given as:  $MPI_i$  is the level of market participation and  $X_i$  is the vector of explanatory variables. The vectors of independent variables are denoted by  $X'$ ,  $i$ , is the vector of unknown coefficients and  $u_i$  is an independently distributed error term. The Tobit decomposition framework suggested by McDonald and Moffitt (1980) as adopted by similar studies can further be disaggregated to determine the effect of a change in the  $i^{\text{th}}$  variable on changes in the probability of household being in poverty. It can be shown that:

$$E(V_i) = F(Z)E(V_i^*) \quad (4.19)$$



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Where  $E(V_i^*)$  is expected value of  $V_i^*$  for those households that are participating, and  $F$  is the cumulative normal distribution function at  $Z$ . Where  $Z$  is  $X\beta/\delta$ .

For a change in any aspects of household explanatory variables ( $X_i$ ), the effect on participation can be decomposed into two by differentiating equation (above) with respect to the specific rural household characteristics.

$$\frac{\Delta E(V_i)}{\Delta X_i} = F(Z) \left\{ \Delta E \left( \frac{V_i^*}{\Delta X_i} \right) \right\} + \{ \Delta F(Z) / \Delta X_i \} \quad (4.20)$$

Multiplying through by  $X/E(V_i)$ , the relationship in equation (above) above can be converted into elasticity forms.

$$\frac{\Delta E(V_i)}{\Delta X_i} * \frac{X_i}{E(V_i)} = \frac{F(Z) \{ \Delta E(V_i^*) / \Delta X_i \} X_i}{E(V_i) + E(V_i) + E(V_i^*) \{ \Delta F(Z) \Delta X_i \}} \quad (4.21)$$

Rearranging equation (4.14), using equation (4.13), we have

$$\{\Delta E(V_i) \Delta X_i\} \cdot X_i / E(V_i) = \{\Delta E(V_i^*) / \Delta X_i\} X_i / E(V_i^*) + \{\Delta F(Z) / \Delta X_i\} X_i / F(Z) \quad (4.22)$$

Therefore, the total elasticity of a change in the level of any variable of the household's participation consists of two effects: the change in the elasticity of the probability of participating and the change in the elasticity of the participating intensity for household.

The explicit Tobit model for estimation in this study is stated as follows;

$$MPI_i = \beta_0 + \beta_1 \text{gender of head} + \dots + e_i \quad (4.23)$$

Where:

$MPI_i$  is a vector for the dependent variable market participation.

$MPI_i$  is a vector for the dependent variable representing the level of market participation.

$X_i$  is a vector for the explanatory variables.

$\beta_0$  is a constant

$\beta_1 \dots \beta_{11}$  are the coefficients for estimation and

$e$  is the normally distributed error term.

#### 4.6. Variable description

Participation is not a random process because farmers ought to decide to participate either in the market or not, given a set of factors (Gani & Adeoti, 2011). Such factors are categorized as the socio-economic factors, market factors and the institutional factors, which comprise access to extension service, government support services, and farmer group membership. Table 4.2 below presents a summary of key variables of market participation and their hypothesized relationships with the dependent variable.

**Table 4.2 Description of Variable and Hypothesized outcome**

Variable	Description	Measure	Expected sign	
			Output market participation (MP)	If sold any crops or not
Market participation index (MPI)	Intensity of market participation	Participation Index	MP	MPI
<b>Socio-economics variables</b>				
X <sub>1</sub> = Gender	Gender of a household head (HHhead)	1=Male; 0=Female	+/-	+/-
X <sub>2</sub> = Age	Age of HHhead	Number of years	+	+
X <sub>3</sub> = Household size	HH family members	Number of people	+/-	+/-
X <sub>4</sub> = Marital status	Marital status of HHhead	1, if married, 0 otherwise	+/-	+/-
X <sub>5</sub> = Education	Education level of HH head	Number of years schooling	+	+
X <sub>6</sub> = Main Occupation	Occupation of HHhead	1, if farmer, 0 otherwise	+/-	+/-
X <sub>7</sub> = Experience	Farming experience of HHhead	years of in crop farming		+
X <sub>8</sub> = Income	Wages, remittances, social grants, pension	D=1 if non-farm; 0 otherwise	+	+
<b>Market factors</b>				
X <sub>9</sub> = Cultivated farm Size	Area cultivated	Acres	+/-	+/-
X <sub>10</sub> = Equipment	Available Farm equipment	D=1 if owned; 0=otherwise	+	+
X <sub>11</sub> = Transport owned	Household vehicle	D=1 if yes; 0, otherwise		+
X <sub>12</sub> = Distance to market	Nearness to market	Kilometres D=1 if within less	-/+	-/+

		than 20km; 0, otherwise		
X <sub>13</sub> = Price	Unit price of a crop	Rands		+/-
<b>Institutional factors</b>				
X <sub>14</sub> = Extension services	HH access to extension services	D=1 if yes; 0 for no	+	+
X <sub>15</sub> = Financial Support	Financial support received	D=1 if yes; 0 for no	+	+
X <sub>16</sub> = Skills/training	training acquired	D=1 if farming related, 0 for no	+	+
X <sub>17</sub> = Group membership	HH participation in farmer group	D=1 if FG; 0=Non-FG	+	+

**Source: SPSS generated results from field survey, 2017**

#### 4.6.1 Socio-economic factors



Farmers' household characteristics include; gender, age, education, household size, marital status, number of children in the household, primary occupation of household head, farm experience and income (both farm and non-farm income).

##### - Gender (X<sub>1</sub>)

It represents the gender of the household heads and was measured as a dummy variable taking 1 if a household head is a male and 0 if female. Although the constitution of South Africa is non-discriminatory, gender disparity remains highly rampant against independent ownership and control of land (Segalo, 2015). Women are still discriminated against land rights and ownership have been unfavourable for women (Ramoroka, 2012). As a result, women have been deprived of opportunities for farming, and of course causing a greater impact on market participation and income generation (Ramoroka, 2012). According to Cunningham *et al.* (2008), gender on its own is likely to reveal the orientation differences between male and female household heads particularly towards markets.

According to Cunningham *et al.* (2008), women are homemakers; therefore, they prefer to store output for home feeding than selling it. The author finds men having an intrinsic behaviour of financially providing for the family. Therefore, male farmers tend to sell as long as the market is available. Moreover, traditionally, men are in charge of the household, they then create rules, which unintentionally excludes women (Ngomane & Sebola, 2016). Often times, women have to seek permission from the husband before they initiate any activities including the market and market related activities. If this observation holds, it is expected that the gender coefficient would be positive; however, in consideration of the land tenure issues, this study expects that women would less likely participate in the market.

- Age ( $X_2$ )

The impact of age on market participation is always not very straightforward because the direction its impact depends on other various aspects such as experience, access to resources and risk preferences (Zamasiya, mango, Nyikahadzoi & Siziba, 2014). Measured in the complete number of years, age is often expected to negatively affect participation in agricultural markets because as a farmer grows old, they become physically unfit to carry out the agricultural activities, which are very labour intensive requiring physical strength. In addition, older farmers view farming as rather means for survival, and they are just emotionally attachment to farming and the land than to view it as an enterprise (Randela, Alemu & Groenewald 2008). The younger farmers, on the other hand, are oftentimes in pursuit of improving their education level. Once, they are educated, they are most likely to migrate to urban areas in search of better jobs, leaving the older farmers to do all farming activities (Ramoroka, 2012).

Largely, how old one is can also affect their response to innovations in farming practices. Older farmers are risk averse and resistant to change, it is often difficult for them to adopt new technologies. The younger farmers on the other hand, are more open and more receptive to new developments. It is then expected that they would easily understand the

benefits that come with commercialisation (Ramoroka, 2012) and can easily connect with markets (Randela *et al.*, 2008).

- Household size ( $X_3$ )

The size of the household can be seen as an effective measure of labour input and/or consumption unit of the household (Makhura, 2001). As a proxy for free family labour, traditional agrarian studies show that a bigger family has an advantage of the much-needed labour to produce more crop output thereby increasing the household's probability of participating in the market as a net seller (Muricho, 2015). On the contrary, Lapar, Holloway, and Ehui (2003) states that the larger household elicits a negative impact on marketable surplus. This means that there are more people to feed which in turn discourages market participation. Thus reducing the probability of being a net seller (Ramoroka, 2012).

- Marital status ( $X_4$ )

It represents a dummy variable taking 1 if a household head is married and 0 otherwise. Marriage is one of the institutions that still receive respect in the rural community of traditional societies because it is believed to be a panacea for social problems. Moreover, marriage offers stability in possessing and maintaining resources like land, which is a key factor in agricultural production. Traditionally, women would struggle to secure a piece of land unless they inherit from their husbands. Marriage also offers stability in spreading risk among spouses (Anukriti & Dasgupta, 2017). Hence, it is generally believed that married farmers are more stable than unmarried farmers in farming activities (Ntshangase, 2014) for several reasons including additional family labour and bargaining power (Megbowon, 2017). According to Lukangu (2005), a male member in the house indicates more power because women presumably undertake the caregiving role of household responsibility. Hence, it is expected that the outcome impact on the dependent variable would either be positive.



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- Education ( $X_5$ )

Education is a key indicator for poverty reduction (Manyeki, 2020) because when farmers have a reasonable level of education or beyond, they are able to search for information, understand it and interpret it correctly. This enhances their ability to establish their networks and business relationships. They easily adopt better managerial principles and they are better at understanding any financial acumen (Ramoroka, 2012). When farmers lack education, they cannot often communicate effectively and therefore they are limited in exploring and benefiting from opportunities in trade, especially outside their settlement Randela *et al.* (2008). It is likely that uneducated farmers would face high and hidden transaction costs because they are limited in knowledge. However, the opposite can be said if the area presents more remunerative employment opportunities requiring skills that are enhanced by education and farmers may find themselves opting for formal employment than agricultural activities (Lapar *et al.*, 2003). It was expected therefore that education would enhance farmer's decision to participate in the market including the volumes of crops to take to the market.



- Main Occupation ( $X_6$ )

Agriculture as the primary occupation of the heads of the household implies some degree of commitment and dependability. According to Gyau, Mbugua, and Oduol (2016), farmers whose primary occupation was farming were found to be six times more active in market participation than those with a different primary occupation were. The reason for this outcome has been attributed to the fact that farmers depend almost entirely on income from the farm. This encourages them to produce more and will need to engage more in markets (Gyau *et al.*, 2016; Muricho, 2015).

- Farm Experience ( $X_7$ )

It represents the household heads' main occupation and was measured as a dummy variable taking 1 if a household head is mainly farmer and 0 otherwise. Farm experience measures the period in number of years that a farmer has been in crop farming activities. It can be hypothesized that the longer the period the farmer has been involved in farming, the more experienced the farmer. The more the number of years of farming the more the

knowledge and ideas possessed by the farmer on what of improvements are needed (Obi & Pote, 2012).

- Income ( $X_8$ )

It represents income generated from sources outside the farm. Such sources include formal workplace wages, remittances, social grants, and other non-agricultural businesses. The availability of income from these other sources can help reduce farm technical constraints and increase alternative capital inputs (Obi & Pote, 2012). This has a potential to boost production and enhance market participation (Alene *et al.*, 2008).

#### 4.6.2 Market factors

Market factors include; cultivated farm area, farm equipment, own transport, distance to market and price of crops. In this study, all these variables expected to have a positive impact on the dependant variable because they necessitates the ease of access to loans and own farm resources.



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- Cultivated farm size ( $X_9$ )

As a productive resource, land ownership patterns are crucial especially for the majority of the black population residing in the rural areas where there is an absence of alternative opportunities. It is inevitable for the dominant empowerment strategies to include agriculture for this segment of the population (Obi, 2006). Although, access to agricultural land in South Africans remains an emotive, sensitive and potentially explosive topic largely due to its history rather than its contribution to national output (Obi, 2006). Unfortunately, the pace of reforms, in general, has been slow and the landless are the most affected (Kloppers, 2014). This continues to affect smallholder farmers who find it difficult to participate in markets because of a lack of access to land for farming (Makhura, 2001). The study, therefore, expected this variable to have either a positive or a negative impact of farmers' market participation depending on the farmer's size of landholding.

- Farm equipment ( $X_{10}$ )

Households who own farm mechanisation and motorized equipment are more likely to plant on time and get their produce to market much easier and on time. In addition, their cost of production is cheaper, which boosts returns. Therefore, their market participation probabilities are expected to be high (Randela *et al.* 2008).

- Transport ( $X_{11}$ )

Transport facilitates interaction among geographical and economic regions. Its role is very crucial as it eases the movement of inputs and farm output to markets, because the production process is not complete until the produce is in the market (Ajiboye & Afolayan, 2009). Ownership of transportation can also reduce the cost of output. It can therefore be expected that the availability of own transport would likely have a positive influence on farmers' market participation decision.

- Distance to market ( $X_{12}$ )

The proximity of the farmer to the nearest market is measured in Kilometres. Makhura *et al.* (2001) found that the further the market is to the smallholders, the less likely are they to participate and sell a higher proportion of output. This is because the farther the household is from the market, the more difficult and costly it is for farmers to transport their produce and the higher the negative impact on the quality of the produce, resulting in lower net benefit to the household (Omiti *et al.*, 2009). According to this study, farmers are close to markets if they are within 20Km of the markets. The study, therefore, expected either a positive or a negative relationship between distance to market and the likelihood to participate in marketing.

- Price ( $X_{13}$ )

The economic theory asserts that output price is an incentive for farm households to supply more of their output for sale in the market (Omondi, 2015; Abu, Osei-Asare, Seini, 2014; Olwande & Mathenge, 2012; Omiti *et al.* 2009). The supply behaviour is that they supply more of their produce if prices are high and less if prices are low. Therefore, output

prices would be expected to have a positive influence on the marketed surplus, if the price is high or negative if prices are low.

#### 4.6.3 Institutional factors

- Extension services ( $X_{14}$ )

Extension service provides a significant critical support in disseminating information on farm technologies and improved farming varieties into a format understandable by farmers (Alene *et al.*, 2008; Siziba *et al.*, 2011). Zamasiya, *et al.*, (2014) also added that extension support reduces risk perceptions among the farmers and thus improve market participation. As a result, this study anticipated that access to agricultural extension services will enhance market participation and marketable surplus. Therefore, a positive relationship between extension support service and market participation would be expected.

- Financial Support ( $X_{15}$ )

The Keynesian model states that for the government policy to achieve the human well-being goal, access to finance for development and improvement of production and market is crucial (Goodwin *et al.* 2008). Thus positively influencing farmer's orientation towards markets. Hence, access to finance should be expected to relate positively to the market and the level of participation.

- Marketing skills/training ( $X_{16}$ )

Agriculture is an important activity in resolving both economic and human development issues (OECD, 2006), but without the necessary skills, it is difficult for example, to keep records and therefore inputs can be easily used inefficiently (Magqibelo, 2016). Training of small-scale farmers has in so many ways been found to improve the possibility of enhancing market participation (Ramoroka, 2012).

- Group membership ( $X_{17}$ )

There has been enough evidence indicating that when smallholders organize themselves in groups and collectively work together to achieve a common goal, they tend to overcome market failures and maintain their position in the market. Such organisations as cooperatives have become important vehicles for producer development. Through their associations, farmers can gain the bargaining power with buyers and intermediaries, which in turn has a potential of spreading fixed transaction costs, have the ease of access to necessary market information and other resources that can reduce barriers to entry into markets (Gyau *et al.*, 2016; Etwire *et al.*, 2013; Randela *et al.*, 2012). Farmer group membership was therefore expected to have a positive impact on market participation.

#### 4.6.4 Dummy variables trap

Although this study is a quantitative one, most of the data collected are qualitative and categorical nature. This means that such variables cannot be measured on a numerical scale. Therefore, the study presented such data as dummy variables. However, the problem of estimation is using a set of dummy variables, which are highly correlated with each other that even the Ordinary Least Squares regression (OLS) cannot identify the parameters of the model. According to Chen, *et al.* (2017), too many dummy variables in the regression from a certain variable including the intercept, would lead to perfect multicollinearity, which makes it difficult to solve the regression. This is referred to as a dummy variable trap. The Dummy Variable trap is a situation whereby the independent variables are highly correlated.

The dummy variable trap can be escaped, by either dropping one of the categorical variables from the set of variables or dropping the intercept from the regression with two ways. That is, if there are  $m$  number of categories,  $(m-1)$  is dropped from the model (Chen, *et al.*, 2017). Then all the parameters of the dummy variables included represent the deviance from such a category as a reference point and the value of that category can be thought of as the reference value and the values of the remaining categories represent the change from that reference (Chen, *et al.*, 2017).

## 4.7 Welfare evaluation

The third objective of the study was to evaluate the impact of output market participation on welfare of the smallholders. This section presents the procedure for evaluation. The theoretical underpinning would also be reflected in the analysis.

### 4.7.1 Outcome variable

Income or consumption expenditure are commonly used to measure welfare. However, these measures have their limitations in both accuracy and measurement, particularly in rural settings where income may come from diverse sources including agriculture and informal economy; income can be highly variable from month to month and vary considerably throughout the year. For example, the farm income is seasonal and it also varies based on the levels of production, which also vary considerably. Consumption expenditure on the other hand have been used to solve the problems of income, such as effects of seasonality in incomes. Households can be forthcoming with expenditure than divulging in information about their incomes. They also have a tendency to recall what they spend their money on. However, expenditure information can be extremely time consuming and expensive to collect. Besides, it is also difficult to measure because households often do not keep records of their expenditure including the possibility of irregular or unplanned expenditures (Karigi, 2014).

Given the aforementioned challenges, constructing the asset-based wealth index as a proxy indicator that directly measure income or expenditures is a necessary (Chasekwa, *et al.*, 2018). The asset-based wealth index can be computed from the accumulated list of household durable assets, such as housing materials, agricultural land and livestock, to create an index of household wealth. Asset ownership is easier to measure reliably than income or consumption expenditures because when people are asked to list their assets, they do not have a problem recalling how many assets they have. There is therefore less missing or inaccurate information (Chasekwa, *et al.*, 2018). Moreover, assets last long so they provide a better and long-term measure of household

socioeconomic status and standard of living. In this study, an asset-based wealth index was used as a proxy for income.

#### 4.7.2 Welfare Evaluation Framework

Following Singh, et al., (1986) and Kahan (2013), the decision to participate in the market occurs only when associated utilities ( $U_{1i}$ ) are higher than utilities derived from non-market participation ( $U_{0i}$ ). According to literature, participation in output markets is supposed to increase household welfare through increasing farm income (Mmbando, 2014). Therefore, the primary outcome of commercialization is household income. If  $Y$  represents the level of household income from participation and non-participation in markets. Then  $Y$  changes from  $Y^0$  which is the outcome unit if smallholders did not participate in markets, to  $Y^1$  representing the outcome unit of market participation, (with  $Y^1 > Y^0$ ).  $U_i \in \{0, 1\}$  Indicate the utilities derived from either participating in markets or not;

$$U_{0i} = U_i(y_i, x_i, p^0, \varepsilon_{0j})$$

$$U_{0j} = U_i(y_i, x_j, p^1, \varepsilon_{1j})$$



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(4.24)

Where  $y_i$  refers to the farmer's income,  $x_j$  is a vector of the farmer's socio-economic variables and attributes of choice, and  $\varepsilon_j$  is the stochastic error term to capture other unobserved factors. Supposed the household utility function as;

$$U_{ji} = \alpha(Y_{ji}) + \varphi'X_{ji} + \varepsilon_{ji} \quad (4.25)$$

Where  $U_{ji}$  is the farmer's expected utility from participating or not in market,  $Y_{ji}$  is expected household income,  $X_{ji}$  are observed factors that affect total utility,  $\varepsilon_{ji}$  is a random component capturing the unobserved factors,  $i$  denotes an individual while  $j$  is an index (1, 0) representing the decision whether to participate or not, respectively. Let  $E$  be the difference in the utilities of the participation and non-participation decisions,

The actually observed change or final state due to market participation is shown by:

$$E_{ji} = U_{1i} - U_{0i} = \alpha(Y_{1i} - Y_{0i}) + \varphi'X_i + \varepsilon_i \quad (4.26)$$

Where  $Y_{1i}$  is the expected income should a farmer participate in markets;  $Y_{0i}$  is the expected income if the farmer chooses not to participate. However, it is difficult to observe the difference in utilities, only the decision that the individual farmer takes can be observed and such a decision is based on the following condition,

$$J_{i \in j} = \begin{cases} 1 & \text{if } V > 0 \\ 0 & \text{otherwise} \end{cases} \quad (4.27)$$

Where,  $J$  is an index (1, 0) representing the decision whether to participate or not, respectively. The farmer is assumed to select the alternative that provides the greatest utility. The higher returns will encourage the farmer's participate, however, he/she chooses to participate, if and only if the returns from market participation are greater than the those derived from non-market participation.

However, evaluating the market participation effects is difficult because only the outcomes of the behaviour of participants can be observed. It therefore makes it difficult to compare the impact of market participation between market participant and non-participant when information about the non-participants is not observable (Mmbando, 2014). This is the factual outcome. The so-called counterfactual, which is the outcome the participants would have been, had they not participated in markets (Khonje, Mkandawire, Manda & Alene, 2015; Caliendo & Kopeinig, 2005). Therefore, the first essential problem is of the missing data. (Bryson, Dorsett & Purdon, 2002).

It is also unlikely that all the sampled farmers would have participated in output markets. Meaning that there is a potential of heterogeneity in the outcomes across the farmers. The important question was what impact participation would have to the farmer who was randomly selected and what would be the impact of participation on the one who actually

participated. The outcomes of both the scenarios would not be similar because farmers are not homogeneous in the characteristics. Estimation of the first scenario yields the Average Treatment Effects (ATE). Following Mmbando (2014), the gains can be expressed as:

$$ATE = E(Y_{1i} - Y_{0i}) \quad (4.28)$$

The expression shows the differences in the expected income from market participation and that which a farmer would have had before market participation. It shows the expected gains from market participation.

The second scenario can answer the question whether participation outcomes are favourable to participants or not. It shows the actual benefits for market participation, the Average Treatment effects on the Treated (ATT). ATT can be expressed as:

$$ATT = E(Y_{1i} - Y_{0i} | D_i = 1) \quad (4.29)$$



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$Y_0$  and  $Y_1$  are household income levels without and with market participation,  $D = 1, 0$  is a binary indicator of market participation. The expression shows the actual outcomes accrued to the participants from participation. However, we can only observe  $E(Y_1 | D = 1)$  the market participation outcome, but we cannot observe the outcomes had they not participated  $E(Y_0 | D = 1)$ . This means that a simple comparison of the outcomes (household income) between participants and non-participants would yield biased estimates of market participation impact (Ali & Sharif, 2012). Otherwise, estimating the ATT using Equation (4.29) may lead to biased estimates. This is selection bias. Following Ayenew (2016), the bias (b) can be given by:

$$b = E(Y_{0i} | D_i = 1) - E(Y_{0i} | D_i = 0) \quad (4.30)$$

where  $D$  is a dummy for market participation,  $D=1$  if a household participates and 0 otherwise),  $b$  is termed as selection bias.

Market participation is not a random process. Therefore, the farmers, both the participants and the non-participants might reflect systematic differences in their outcomes and even in their characteristics, which might make them less comparable (Moyo, 2016). According to Caliendo and Kopeinig (2008), even in the absence of market participation, the two groups may differ, for example, in their family structures, personal motivation etc. Without an appropriate benchmark for comparison, it would be equally difficult to attribute any changes in their outcomes to market participation (Mmbando, 2014). The basic solution to selection bias was to compare the outcomes of both participants and non-participants (Frye & Bartlett, 2017).

The Propensity Score Matching (PSM) by Heckman 1979's and Rosenbaum and Rubin (1983) was used to measure the counterfactual, that is, what would have been the outcome to a similar group not participating in markets. PSM solves this problem by creating a counterfactual from the sampled group of farmers. On the assumption that it is not possible for a farmer to simultaneously be a participant and a non-participant at the same time (Fischer & Gaim, 2012); PSM constructs a statistical comparison group (control group) whose characteristics are similar with the characteristics of the participants (Treated).

PSM relies on the assumption of conditional mean independence, known as Conditional Independence Assumption (CIA), whereby pre-treatment outcomes are independent of participation in markets (Treatment), given their characteristics (Moyo, 2016). It assumes that for every participating farmer, a matching farmer with similar characteristics is found from among the non-participants. It therefore, allows for the counterfactual outcome for the treated group (participants) to be inferred, such that any differences between the treated and the control group can be attributed to the effect of the market participation (treatment) (Bryson, *et al.*, 2002). PSM then matches participants to non-participants with similar values of  $P(X)$ . Following Moyo (2016), it gives equation:

$$E(Y_1 - Y_0|P(X)) = E(Y|D = 1, P(X)) - E(Y|D = 0, P(X)). \quad (4.31)$$

$Y_0$  and  $Y_1$  are household income levels without and with market participation,  $D = 1, 0$  is a binary indicator of market participation.  $P(X)$  is the propensity score, representing the probability of being in the group of market participants given similarities in  $X$ ,  $X$  represents the covariates for market participants. The idea is to compare the impact outcomes of the participants with outcomes of the comparison group so that they show similar characteristics, the propensity scores, and to view the difference as the estimate of ATT. The mean effect of treatment can then be calculated as the average difference in outcomes between the treated and non-treated conditional on probability propensity scores (PPS). ATT is defined as;

$$ATT = E[E(Y_{1i} - Y_{0i}|D_i = 1, P(X_i))] \quad (4.32)$$

$Y_0$  represents the income levels without market participation,  $Y_1$  is for income levels for participants.  $D = 1$ , is a binary indicator for participation and 0 for non-participation.  $P(X)$  is standing in for the propensity score, and  $X$  represents the covariates for market participants. The expression shows that each group has an opportunity to receive treatment (participation), and allows for estimation of the impacts by comparing the observed outcome  $Y_1$  of the treated with the outcome  $Y_0$  of the untreated group to indicate what would have been in the absence of market participation. As define by Rosenbaum and Rubin (1983) the probability of receiving treatment given the explanatory variables:

$$p(X) = P_r(D_i = 1|X) = E(D_i|X) \quad (4.33)$$

Where  $D = (1, 0)$  is the indicator for participation  $X$  represents the vector for pre-treatment characteristics. This expression shows that if market participation is random given the covariates  $X$ , it is also random within the values of  $P(X)$ . As a result, given a population of units denoted  $i$ , if the propensity score  $P(X)$  is known, it means that the distribution of characteristics of the participants may also be observed among the non-participants.

When matching is exact at the propensity score, then the combination of the distribution of  $X$ s, which predict participation and outcomes, will be the same for the participants and comparison samples (Bryson, *et al.*, 2002). This can be substantiated by a sufficient overlap in the covariates of both groups, so that both households have a common probability of being both a market participant and a non-participant, referred to it as a region of common support under the assumption of Common Support Requirement (CSR) (Caliendo & Kopeinig, 2008), such that:

$$0 < P(D = 1 | X) < 1. \quad (4.34)$$

Overlap assumption explains that farmers with the same  $X$  values have the probability to participate in markets but those falling outside the region of support are dropped from the analysis because they are not a good match for the participants (Caliendo and Kopeinig, 2008). Therefore, the validity of ATT estimation is dependent of the substantial overlap of the  $X$  values as an indication that participation conditions applies even on the non-participants. If the two assumptions, CIA and CSR are met, then the average effects of treatment on the treated (specified as the mean difference of the participants matched with non-participants who are balanced on the propensity scores and fall within the region of common support) (Tiri, Mlay & Roselyne, 2020), can be estimated:

$$ATT = E[E(Y_{1i}|D_i = 1)) - E(Y_{0i}|D_i = 0, P(X_i))|D_i = 1] \quad (4.35)$$

Where the outer expectation is over the distribution of  $(p(X_i)|D_i = 1)$  and  $Y_{1i}$  and  $Y_{0i}$  are the potential outcome in two counterfactual situations of participation and non-participation. This expression shows that for a given propensity score, the observable outcomes of both the participants and non-participants,  $E(Y_{1i}|D_i = 1)$  and  $E(Y_{0i}|D_i = 0)$ , respectively, are similar, then mean difference gives an indication of whether the treatment was beneficial to the treated or not.

### 4.7.3 Propensity score estimation

Estimation of PSM followed a two-step process. In the first step, a probit model was used to predict the propensity to participate in markets  $P(X)$ . Probit model as specified in Becker and Ichino (2002):

$$\Pr(D_i = 1|X_i) = \Phi\{h(X_i)\} \quad (4.36)$$

Where  $\Phi$  denotes the standard normal cumulative distribution function (CDF), and  $h(X_i)$  is a function of covariates as linear terms without interactions. The dependent variable was 'market participation' and control variables were the variables thought to have influence on the farmers' decision to participate in market and on the outcomes of market participation. It is expected that the predictor variable would be significantly associated with market participation (Chasekwa, *et al.*, 2018). Otherwise, the only variables that are included in the model should be significantly correlated ( $p < 0.10$ ) with market participation (Chasekwa, *et al.*, 2018). It is also important that there is no causality relationship between the covariate and the outcome variable, meaning that the covariates are not affected by participation (Lubungu, 2013).

Previous research on household welfare (Mmbando, 2014; Ademiluyi, 2014; Yakubu, 2012; Sinyolo, Mudhara & Wale, 2014) has found that several smallholder characteristics like, age, gender, level of education, marital, household size, primary occupation, cultivated farm, distance to nearest market, provision of extension service, government funding/financial support, and farmer group/associations. Before matching, CSR was enforced to get the best combination on the covariates for ATT estimation.

### 4.7.4 Robustness Tests

Once propensity scores have been estimated for all farmers, and CSR was enforced, the matching techniques are applied. Matching is performed to allow comparison between the participants and non-participants, such that if the probabilities of both groups are the same, then (Chasekwa, *et al.*, 2018), the average income of those who did not participate

in markets is used to approximate what would have been the income of the participants had they not participated (Chasekwa, *et al.*, 2018). For this purpose, the study used the nearest neighbour matching (NNM) methods. The NNM involved identifying a single non-participating farmer for each participating member with most similar observed characteristics (propensities). Thus, selecting the non-participant with the smallest distance in propensity score to the treated group (Awunyo-Vitor, Al-Hassan, & Sarpong, 2014; Caliendo & Kopeinig, 2008). Following Becker and Ichino (2002), let  $T$  represent the participants and  $C$ , the non-participants, let  $Y_i^T$  and  $Y_j^C$  be the observed outcomes of the participants and non-participants, respectively. Denote by  $C(i)$  the set of non-participants matched to the participants  $i$  with an estimated value of the propensity score of  $p_i$ . NNM sets;

$$C(i) = \min_j \|p_i - p_j\| \quad (4.37)$$

Where equation 4.37 is a singleton set, that is a unit set containing a single element of nearest neighbours (NNM), denoting the number of controls matched with the observation  $i \in T$  by  $N_i^C$  and define the weights  $w_{ij} = \frac{1}{N_i^C}$  if  $j \in C(i)$  and  $w_{ij} = 0$  otherwise. Then, the matching estimators can be formulated as:

$$\begin{aligned} Var(T^M) &= \frac{1}{(NT)^2} \{ \sum_{i \in T} Var(Y_i^T) + \sum_{j \in C} (w_j)^2 Var(Y_j^C) \} \\ &= \frac{1}{(NT)^2} \{ N^T Var(N_i^T) + \sum_{j \in C} (w_j)^2 Var(Y_j^C) \} \\ &= \frac{1}{N^T} Var(Y_i^T) + \frac{1}{(NT)^2} \sum_{j \in C} (w_j)^2 Var(Y_j^C) \end{aligned} \quad (4.38)$$

In the expression, to derive the variances of the matching estimators, the weights are assumed to be fixed and the outcomes are assumed to be independent across units (Becker & Ichino, 2002).

## 4.8 Summary of the Chapter

The purpose of this chapter was to outline the methodologies employed from the selection of the study to the procedures for data collection and analysis of data. It was shown in the chapter that the three irrigation areas Qamata, Tyefu and Zanyokwe irrigation area in Intsika Yethu, Ngqushwa and Amahlathi local municipalities were purposely selected basically because of they are considered to be the one of largest in the province, were mainly considered based on their functionality. A review of the analysis of these areas shows that they are generally poor with limited resources and yet with diverse sources of livelihoods. The economic status of farm households in these areas showed that the majority of them are largely dependent on social grants for their incomes and agricultural activities are a major source of food staple for consumption at home. 210 households were interviewed using a structured questionnaire.

To analyse the data, the descriptive and econometric tools were employed. The market participation index was used to determine the intensity at which smallholder irrigators participate in markets. The multiple-level choice models using probit and Tobit regression were employed to examine the market participation decision. Estimation procedure followed two stages, where the first step analysed the participation decision and identified the factors for market participation. Thus, estimation of a probit regression. The second step estimated the truncated regression to examine the farmers' decision on how much quantity of crops to sell.

The analysis of the impact of crop output market participation on household welfare measured by asset-based wealth index as a proxy for household income was also presented. The propensity score-matching techniques were employed to estimate the welfare impact of market participation for binary treatment. The PSM was used to compare the differences in outcomes of those farmers who participate in markets and their state had they not participated in markets. Estimation of PSM first employed the probit regression model to estimate the probability of smallholder farmers in engaging in

marketing activities and how engaging in market activities contributed to improvements in the farmer's household wellbeing. The next chapter presents descriptive results.



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## CHAPTER 5

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# SOCIO-ECONOMIC PROFILE OF THE SMALLHOLDER FARMERS

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### 5.1 Introduction

The aim of the study was to evaluate progress the rural smallholder farmers have made towards achieving commercialisation. The extent to which the smallholder farmers participate in market was therefore examined in that regard and the findings are presented in this chapter. However, it was necessary for the study to understand the socio-economic background of the sampled farmers to identify the notable features of the farmers that can possibly influence their market participation behaviour. The study developed a profile of the sampled smallholder farmers. The percentage distributions of socio-economic characteristics of the sampled smallholder farmers are presented in the chapter. The chapter is concluded with a summary.



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### 5.2 Demographic and socio-economic characteristics of sampled households

The demographic and socio-economic characteristics of households are considerably inherent in rural livelihoods. These characteristics include gender, age, marital status, family size, educational attainment, primary occupation and income level. They influence the economic and welfare behaviour of individual households (Bembridge, 1988). The means, standard deviations, percentages, and standard deviations were used to describe the socioeconomic characteristics of smallholders and these are presented in Table 5.1.

**Table 5.1 Distribution of Demographic Characteristics of the Smallholders**

Characteristics	Description	No. of HH	% of total	Mean	Stdv.	Total value & %
Gender of household head (HH)	Male	129	61.43			(210) 100%
	Female	81	38.57			
Age of household head (years)	21-40	17	8.1	61	12.7	(210) 100%
	41-50	23	10.95			
	51-60	63	30			
	61≥	107	50.95			
Marital status	Married	72	34.29			(210) 100%
	Not married	138	65.71			
Household size (No. of people in the household)	≤3	85	40.48	5	2.44	(210) 100%
	4-6	83	39.52			
	7-9	33	15.71			
	10≥	9	4.29			
Education level of household head (No. of years spent in school)	None	15	7.14	7	3.65	(210) 100%
	1-7	71	33.81			
	8-12	114	54.29			
	13≥	10	4.76			
Primary occupation of household head	Farm	149	70.95			(210) 100%
	Non-farm	61	29.1			

Source: SPSS generated results from field survey, 2017

### 5.2.1 Gender of household head

Household heads are the main decision makers for household and agricultural activities and as such, gender distributions of the study sample were investigated. Based on the findings in Table 5.1, the most observed gender were males with 61.43% representation. This finding imply that majority of rural men are engaged in farming and they make the decision pertaining agricultural activities, while women pursue a number of different activities that contribute to household livelihoods. This finding rejects the feminisation of agriculture in Africa, where women are known to dominate farming activities especially

crops farming (State of Food and Agriculture (SOFA) & Doss, 2011), as the majority of the men were migrated to other parts of the country where they worked as miners and migrant labourers (Jiba, 2017).

Rural men in South Africa left their homes as the effect of the two most pervasive effects of apartheid regime (Rakometsi, 2008). Under the apartheid system, the blacks had to sell their labour in a white urban or rural area, leaving behind their wives who were not allowed to accompany them to the white areas (Rakometsi, 2008). Women remained subsisting on the land. It was only when their men were no longer considered economically productive, they are expected to return to their homes live with their families and take charge of the farms. This trend has been exacerbated by the changing technologies in the mining industries. Moreover, the global economic and financial crisis also led to retrenchments as companies cut costs to compensate for falling commodity prices (Mondi, 2016).



On the one hand, besides that agricultural activities favour men because of their physical strength (Dlova, Fraser & Belete 2004), this finding is a significant reflection of gender differences in the distribution of agricultural resources in South Africa. Women not only in South Africa but across Africa, were not allowed to have access to and own land. They only have access to farmland through their husbands or fathers. Based on this result, it is clear that decision-making authority and access to markets still present a challenge for women in the sector (Sishuba, 2016).

### **5.2.2 Age of household head**

Age is one of the most important variables in the analysis of maturity, experience, ability to make sound decisions, aspirations, and expectations, (Jiba, 2017). The age of the household head determines largely, the experience of the head in agricultural activities and this experience allows him/her to make informed decisions in agricultural activities as compared to younger rural farmers with limited experience. Similarly, the age of a person has a bearing on the way a person is treated or is able to treat others. For example, older

people are seen as responsible and reliable, while the younger people may be seen as less reliable and respectful. Therefore, they may not be treated with respect like the one the older people would get (Jiba, 2017).

According to the survey data, the majority of the farmers were observed to be above the age of 51 years. This observation confirms the perception that agricultural activities are left in the hands of the older population as the youth migrate to urban areas to seek employment in the modern sectors (Manciya, 2012). The mean age of active rural farming participants is 61 years and is above the South African retirement age of 60 years. This may suggest that on retirement from their monthly wage employment, the immediate way of earning a living is to engage in agriculture, as this is the most popular rural activity in the rural economy with the least adjustment costs.

### **5.2.3 Marital status of household head**



From the findings, it was observed that majority of the respondents; approximately 66 per cent were not married as at the time of the survey and only 34 percent were married. This finding reflects that agriculture is indeed the main source of livelihood. More specifically for the unmarried farmers who are either never married, divorced or widowed, this group lacks the spousal support and agriculture offers them the means for survival. In terms of market participation decision making, Becker's (1981) unitary household model assumptions are that a household is a single decision-making unit who together make the production and consumption decision. Anukriti and Dasgupta (2017) counter this assumption and alludes that although households make decision as a unitary model, they are not always Pareto efficient. This suggests that sometimes households fail to efficiently allocate agricultural resources due to the lack of commitment, communication and/or if the spouse's objectives differ from those of his or her partner, resulting in inefficient outcomes.

Moreover, the decision-making process is oftentimes dependent on spousal consent, especially for married women. For example, a husband's consent is always required

before a woman can engage in any activity, failing which, the woman's ability to meet her objectives is lowered (Anukriti & Dasgupta 2017). Hence, the participation of those farmers who were married was much higher than that of their unmarried counterparts.

#### **5.2.4 Household size**

Observations on the size of the household shows that the average size of the household in these rural areas is composed of five members, with the majority (41 percent) having at least three or fewer members in a household. According to literature, smallholder-farming activities greatly rely on family labour for the execution of different farm activities. However, the family labour is effective if all or most of the family members are mature enough to perform the farm work, otherwise, a large family composed of young family members may translate into high dependency ratio. The farm resources are then limited because of the high household expenditure due to the larger number of people depending on the household head (Dlova *et al.*, 2004).



Considering the ages of the respondents, the results had shown that the majority of the farmers were above 51 years of age. When this age is merged with the household size of about three members or less, this finding might suggest that an elderly parent is living with either the two minor children or two elderly grandparents living with a grandchild. This has been a norm in South Africa since the apartheid era, where old people played a crucial role in holding families together (Makiwane, 2011). According to Makiwane (2011), many children in South Africa are usually taken care of by grandparents when young adults migrate to urban centres in search of better jobs.

#### **5.2.5 Educational level of household heads**

Educational level is one of the most crucial variables in farm decisions. In our modern day life, it is believed that an individual with higher educational qualifications are more receptive to new ideas provided by agricultural extension officers (Jiba, 2017). It was observed that the sampled household heads were generally literate, with about 7% having

no formal education. Persons with an average education of at least 12 years or more years in school headed the rest of the enumerated households. This suggests that the majority completed the metric level. With this level of education, it suggests that the sampled farmers are in a position to seek, read and interpret marketing information (Christian, 2017), thus enhancing interaction and exchange of information and therefore increases market participation.

### **5.2.6 Primary Occupation of household heads**

The primary occupation of the household head is important in that whatever he/she consider as the main source of livelihood has a bearing in addressing the most pressing needs. With reference to Table 5.1 about 71 percent of the households take farming as a primary (main) occupation while 29 percent take farming as a secondary income generating source to supplement other sources of their livelihood. Based on the sample results, it is clear that agriculture is the main source of livelihoods of rural households (Randela, 2005).



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### **5.2.7 Sources of income of the household**

Income is the key factor to decide the economic situation of the smallholders and it has a great influence on their market behaviour. Once an individual has income this means that he/she will have access to food and be able to purchase other non-agricultural goods for the household needs. The study explored income and their respective sources since household income determines the livelihoods of people. Income of the respondents is the earning from different sources in the form of salaries, remittance, grants and so on. These exclude earnings from the farm activities. Table 5.2 shows the distribution of the income source of the sampled households.

**Table 5.2 Distribution of Sources of Income**

Source	Description (R'000)	No. of HH	% of total income	Yes (%)	Average Income	Total value & (%)
<b>Distribution of farm in the last farming season</b>						
Farm	None	35	16.7	83.3	2870.95	<b>210</b> (100%)
	≤1000	77	36.7			
	1001-3000	46	21.9			
	3001-5000	25	11.9			
	5001≥	27	12.86			
<b>Monthly distribution of non-farm income</b>						
Wage	None	166	79.05	20.95	590.00	<b>210</b> (100%)
	≤1000	4	1.9			
	1001-3000	26	12.38			
	3001-5000	14	6.67			
	5001≥	0	.0			
Remittance	None	31	14.76	85.24	3445.52	<b>210</b> (100%)
	≤1000	12	5.71			
	1001-3000	57	27.14			
	3001-5000	81	38.6			
	5001≥	29	13.76			
Social grant/ Pension	None	6	2.86	97.14	1704.38	<b>210</b> (100%)
	≤1000	46	21.91			
	1001-3000	142	67.62			
	3001-5000	12	5.71			
	5001≥	4	1.9			
<b>Per Capita household Income CPI</b>						
	≤5000	187	89.05	-	2606.08	<b>210</b> (100%)
	5001 -1000	17	8.09			
	10000≥	6	2.86			

**Source: SPSS generated results from field survey, 2017**

The survey shows that smallholder farmers in the rural areas of Qamata, Tyefu and Zanyokwe areas have several sources of incomes as indicated in Table 5.2. In Table 5.2, it can be observed that farmers engage in different agricultural and non-agricultural activities that sustain their livelihoods. Approximately 21 percent were employed and they

earned a wage or salary and 83 percent of the respondents earned income from farming. The results confirm the findings in Thamaga-Chitja and Morojele (2014), Francis (2006) and Anseeuw *et al.* (2001) that the majority of the households in the rural areas of South Africa largely depend on social grants (97 percent) and remittances (85 percent) for their livelihoods.

The distribution of the respondents based on their asset-based income shows that the majority (89.1 percent) of the respondents have less or equal to R5 000 monthly, 8.1 percent have between R5 001-10 000 monthly, while only 2.9 percent of the respondents have more than R10 000 asset worth of income. The estimated monthly mean income earned is R2 606.08 which according to the World Bank (2008) when distributed daily ( $R2606.08 / 30 = R86.9$  per day per person) is above the international poverty line of \$1.90 purchasing power parity (PPP).

### **5.2.8 Ownership of Transportation and communication technologies**



Transport and communication devices provides the means for smallholder farmers to interact and transport their produce to the market. The distribution of farmers according to whether they have ownership for example a cell phone, or any form of transport is presented in Table 5.3.

**Table 5.3 Distribution of Farmers by Ownership of Transport**

Farmer Response		Variable			
		Transport		Communication Equipment	
		No. of Households	%	No. of Households	%
<b>No. of Households</b>	<b>Yes</b>	137	65.2	189	90
	<b>No</b>	73	34.8	21	10
<b>Total</b>		<b>210</b>	<b>100.0</b>	<b>210</b>	<b>100.0</b>

Source: SPSS generated results from field survey, 2017

From the results, it is revealed that 65.2 percent of the farmers in Qamata, Tyefu and Zanyokwe areas do not own transport while 34.8 percent have their transport. The 65.2 percent who do not own transport either hire a van or use public transport to convey their farm produce to the market, which results in delays, and compromise the freshness of the produce. On access to communication equipment (such as cellphones), for ease of access to market information, the results revealed that 90 percent of the respondents had access to communication equipment while only 10 percent did not have access to communication equipment. Good communication enhances the market participation.

### 5.2.9 Size of Farm and cultivated land size

The size of the area under cultivation plays an important role on market participation through the increased production output. High productivity may imply output beyond food sufficiency, meaning that the farmer would likely have greater quantities of surplus for the markets. The distribution of the sampled farmers by farm size and the cultivated size of farmland is presented in Table 5.4.

**Table 5.4 Distribution of Farmers by Farm Area under Cultivation**

Farm Distribution	Farm size			Cultivated farm size			
	No. Of Households	%	Mean	No. Of Households	%	Mean	Std.v
≤ 1	121	57.62	1.15	111	52.86	1.25	1.16
1.1-3.0	77	36.67		88	41.90		
3.1-5.0	8	3.81		6	2.86		
Above 5.0	4	1.90		5	2.38		
<b>Total</b>	<b>210</b>	<b>100.0</b>		<b>210</b>	<b>100.0</b>		

Source: SPSS generated results from field survey, 2017

The majority of the sampled farmers have access to a very small sized farm holding. On average, farmers have access to and cultivated at least 1.15ha and 1.25ha respectively, confirming that farms in the developing world are typically small which in South Africa maybe because of the prevalent land-tenure issues which has not allowed people/farmers to have right to ownership and control of land (Buckmaster, 2012).



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### 5.2.10 Distance to Market

Distance to market measures the proximity of produce markets from the homesteads. The longer the distance or the furthest the market is, the higher the cost involved in transporting the farm produce. Depending on where the irrigation schemes are located, the nearest town is where the market typically Spar and Boxer's supermarket is located. According to this study, the closest towns, Cofimvaba and Peddie are located within 20km of the study areas. The summary statistics on the distance between farmers and output markets are presented in Table 5.5.

**Table 5.5 Distribution of Farmers by Distance to Markets**

<b>Distance to Market (km)</b>	<b>No. of Households</b>	<b>Percentage</b>	<b>Mean</b>	<b>Std. Dev</b>
≤ 10	21	10.00	23.0	16.7
11-20	119	56.67		
21-30	39	18.57		
Above 30	31	14.76		
Mean (23.0)				
<b>Total</b>	<b>210</b>	<b>100.0</b>		

**Source: SPSS generated results from field survey, 2017**

Results indicate that 10 percent of the respondents are located within 10km from the market, 56.7 percent are 11-20km from the market, 18.6 percent are 21-30km from the market and 14.8 percent are more than 30 km from the market. The estimated average distance from the market for the respondents is 23.0km and about 66.7 percent of the smallholders reside within a distance less than 23km from the market.

  
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### **5.2.11 Access to government supports**

The role of government intervention in the development of smallholder farming cannot be ignored. This intervention may come in the form of financial support, marketing, managerial or monitoring and evaluation of smallholder projects, among others. According to the Keynesian model, government has a role to create an enabling environment and provide support for development and improvement of production (Goodwin *et al.* 2008) to ensure the viability of smallholder farmers from a household food security level to commercial level.

Literature has also widely demonstrated that if supported, smallholder agriculture has a potential to effectively contribute to more than food security, but creation of jobs, the emancipation of disadvantaged and marginalised groups, and removal of the socio-economic inequalities. Government also has a role to correct market failures to allow

farmers access to funding or credit and, ultimately promote higher levels of growth (Manganhele, 2010). Table 5.6 presents the types of government support and frequencies on whether a household received support or not.

**Table 5.6 Distribution of farmers and Type of Support**

Received support	No. of household heads				
	Financial support	Training on input use	Record keeping	Agro-processing	Marketing activities
<b>No</b>	56	70	209	96	205
<b>%</b>	26.67	33.33	99.52	45.71	97.62
<b>Yes</b>	154	140	1	114	5
<b>%</b>	73.33	66.67	0.48	54.29	2.38
<b>Total</b>	<b>210</b>	<b>210</b>	<b>210</b>	<b>210</b>	<b>210</b>
<b>%</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100.0</b>	<b>100.0</b>

Source: SPSS generated results from field survey, 2017

The result in Table 5.6 reveals that government provided support to the small-scale farmers in the Qamata and Tyefu areas as part of the rural economic development and poverty reduction strategy. The results show that the majority of farmers in these areas received financial, input use and agro-processing support. However, assistance for marketing activities is lacking in the areas, as only 2 percent of the farmers received such help. Based on the findings, it is not surprising the farmers still live in abject poverty.

### 5.2.12 Farmer group membership

Generally, farmer associations or groups play as intermediaries between member farmers, government agencies and even lenders. Farmer organizations facilitates or empower and member farmers to negotiate contracts and meet potential buyers. They can also help farmers to negotiate with creditor institutions, policymakers, marketing boards, the Government (Manganhele, 2010). The associations can also help members to increase the production of marketable surplus through the reduce production risk. When farmers act collectively, they gain a bargaining power especially on inputs market.

Table 5.7 shows the distribution of farming households by membership of the farmer group.

**Table 5.7 Distribution of Farmers by Farmer Organisation**

Response	No. of Households	%	Mean	Std. Deviation	[95% Conf. Interval]
Yes	139	66.19	.66	.4741915	.5973966 .7264129
No	71	33.81			
<b>Total</b>	<b>210</b>	<b>100</b>			

Source: SPSS generated results from field survey, 2017

Table 5.7 elucidates that 66.2 percent of the sampled farmers are members a farmer groups such as cooperatives. This is encouraging in that communities endowed with a rich stock of social networks and civic associations as expressed in farmers' cooperative society membership are in a stronger position to resolve disputes, share useful information, set up informal insurance mechanisms, implement successful local development projects, and confront poverty and food security.

### 5.3 Crop production and market assessment

The farming system in the Qamata, Zanyokwe and Tyefu areas is multi-crop in which a number of crops feature prominently. The summary statistic below point to a considerable diversity in the range of crops grown by the smallholders. Table 5.8 shows the distribution of households per crops sold.

**Table 5.8 Distribution of Farmers by Crop output and sales**

Crop & its measure	No. of Household		Average Quantity Units		% Sales
	Harvested Crop	Sold crop	Harvested (00)	Sold (00)	
<b>Maize (10kgs)</b>					
Yes	189	139	1449	988	68.2
No	21	50			31.8
<b>Total</b>	<b>210</b>	<b>189</b>			<b>100.0</b>
<b>Potatoes(10kgs)</b>					
Yes	96	72	268	193	72
No	114	24			28
<b>Total</b>	<b>210</b>	<b>96</b>			<b>100.0</b>
<b>Butternut/Pumpkin (10kgs)</b>					
Yes	47	35	27	16	59.2
No	163	12			40.8
<b>Total</b>	<b>210</b>	<b>47</b>			<b>100.0</b>
<b>Cabbage (Head)</b>					
Yes	92	71	1117	1087	97.3
No	118	21			2.7
<b>Total</b>	<b>210</b>	<b>92</b>			<b>100.0</b>

**Source: SPSS generated results from field survey, 2017**

According to the findings, maize, beans, potatoes, pumpkins/butternut and cabbage were the most grown crop in these areas. However, maize followed by potatoes, has the highest sales followed by potatoes. Maize is a staple crop in the Eastern Cape. This means that the home consumption of maize must first be satisfied (32 percent for home consumption) before the surplus (68 percent) is taken to the market. Potato is another important crop that is widely consumed in the area. Compared to maize and potatoes, cabbage was the most frequently sold crop while only 2.7 percent was used at home. This may be because cabbage is difficult to preserve or store.

An important part of the investigation was to ascertain the reasons and motivations for the choice of individual crops grown and the level of investment in the particular crop. In

terms of the reasons given by the farmers for the decision regarding the choice of crops, income/market featured in all cases as the most important. The level of investment in different crops, relative popularity and their market potential were examined. One indicator identified to have relevance to the relative importance of the crop and its degree of commercialisation was the portion of the crop sold (Kibirige, 2013). Results indicate that cabbage has the highest portion sold, followed by potatoes, maize and butternut/pumpkin combination in that order.

This section first presents the mean distributions of the socio-economic characteristics of the sampled smallholder farmers towards market participation. Table 5.9 presents the distribution of the socio-economic characteristics of sampled smallholder farmers who participated in market against the non-market participants.

**Table 5.9 Summary Statistics of farmers and Market Participation**

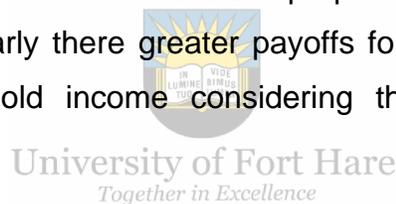
Variable	MP Average		
	Yes	No	Total
Age	61	62	61
Household size	5	4	5
Marital status	2	2	2
Primary Occupation	0.7	0.5	0.7
Farm Experience	14	15	14
Household Income	8676.20	8240	8611.81
Cultivated farm size	1.2	1.5	1.3
Distance to Market	23	24	23
Extension service	0.5	0.1	0.4
Market training	0.03	0	0.02
Farmer Association	0.6	0.9	0.7

**Source: SPSS generated results from field survey, 2017**

The distribution of the farmer characteristics revealed that both the farmers who participate or did not participate in output markets were old at age 61. The average size of the household revealed larger size household members of market participants than the non-participants. Only 2 percent of the married household heads were either participating in markets or not. Those household heads whose primary occupation is agriculture

participated more in markets than those who depend on other sources for living. The non-market participants had on average, 15 years of experience in farming while the market participants have 14 years of farm experience. The average household income for market participants was at least R436.0 more than the average household income of the non-participants. Those farmers who participated in markets, they cultivated on 2.1 Acre of land, 0.3 lesser than the area cultivated by those who did not participate in markets. The non-market participants were located at least 1 Km away from the market participants who were at least 23 Km away from the markets. The market participants have received support from both the extension officers and government much more than the non-participants who actually reported no financial assistance from government. However, they participated more in farmer associations than those who participated in markets.

In general, the findings revealed that there are proportions of smallholder farmers who participate in markets. Clearly there are greater payoffs from their participation in the market as indicated by their household income considering that farming was their primary occupation.



#### **5.4 Summary of the Chapter**

The purpose of this chapter was to present the study findings on the socio-economic characteristics and to measure progress in achieving commercialisation of smallholder farmers. The variables of interest were gender, age of household head, marital status, household size educational level attained by the household head, and level of income. The overall findings indicated the important differences in behaviour regarding the transition from subsistence to market oriented farming. The findings indicated that the majority of the farmers in the Qamata, Zanyokwe and Tyefu were male. The findings also showed that both groups of farmers, those who participate and those who do not are at an average age of 61. The livelihood evidence in the area shows that many households depend largely on agriculture, although there was also evidence of involvement in alternative activities. It was also found that although agriculture is the primary activity for

livelihood, it was found not to be the primary contributor to family income. Rather, the highest contributor to the rural household income has been remittances. From the standpoint of the market, maize is the most popular crop followed by potatoes, but potatoes are mostly sold in the market.



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## CHAPTER 6

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### LEVEL AND DETERMINANTS OF MARKET PARTICIPATION

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#### 6.1 Introduction

This chapter presents the econometric results in which the study determined the level of market participation and factors affecting the market participation behaviour of the smallholder farmers and the degree of their market participation. The two-stage regression was employed. The probit regression was used to analyse the farmers' market participation decision and determine their factors and the model was truncated to reveal the factors for farmers' degree of market participation. The chapter provides a detailed presentation and discussion of the results.

#### 6.2 Level of Market participation of smallholders

The primary objective of this study was to establish the level at which smallholders participate in output market. In other words, to find out how much of their crops they have sold. This will enable the researcher to determine farmers' progress along the commercialization line. The levels of market participation was arrived at by using Composite Score Approach; MPI. The MPI\*100 computed in the data in percentages was used by computing the mean and standard deviation as required for the categorisation process into the levels. Below in Table 6.1 is the summary distribution of the sampled smallholder farmers according to their categorisation which correspond to censoring values of 0=subsistence, 1=semi-commercial and 2=commercial level.

**Table 6.1 Distribution of households by market participation level**

Level of participation	No. of household	Percentage	Cum.
0 = Subsistence	46	21.9	21.9
1 = Semi-commercial	122	58.1	80.0
2 = Commercial	42	20	100.0
<b>Total</b>	<b>210</b>	<b>100.0</b>	<b>100.0</b>

**Source: SPSS generated results from field survey, 2017**

According to the results in Table 6.1, it can be seen that 21.9 percent of the operate in the in subsistence range, 58.1 percent have transitioned from subsistence to semi-commercial state and 20 percent of the sampled smallholders operate at a commercial level of farming. The MPI\*100 computed in the data was used by computing the mean and standard deviation as required for the categorisation process into the levels. The following is Table 6.2, presenting the results of the level of commercialisation of the sampled smallholder farmers.



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**Table 6.2 Level of Market Participation (MPI)**

Variable	Obs	Mean	Std.v	Min	Max
<b>MPI</b>	210	55.42287	34.30165	0	100

**Source: SPSS generated results from field survey, 2017**

The results in Table 6.2 shows that 210 smallholders were sampled. Based on the composite score, three levels of commercialisation can be identified as;

- i) the high level of participation, which according to the study represents “full commercialisation” ranges between 100 points to the Mean and standard deviation points,
- ii) the medium level of participation, “semi-commercial” runs between upper and lower categories, and
- iii) The lowest level of market participation, which is between the Mean and standard deviation to zero (Olarinde, Adepoju, Adio, Fanifosi, Abass, Abdoulaye &Wasiu, 2020).

According to the composite analysis, the mean value reveals that the sampled smallholder farmers have at least sold on average 55.4% of their farm output. This finding indicate that the degree of Commercialisation in the study area is fairly moderate. According to Fakunle and Obi (2017), farmers who sell at least a half of their produce shows that, they have gradually made the transition from subsistence to semi-commercial farming.

### **6.3 Determinants of output market participation**

Table 6.3 presents the results of the analysis enunciated in the previous section to show what factors are important in explaining smallholders' behaviour in relation to market participation and the constraints and challenges that need to be taken into account in planning strategies to optimize market accessibility and enhance household welfare. Three sets of factors were identified in the previous section as socio-economic and demographic characteristics, market factors, and institutional factors. Table 6.3 allows us to evaluate the roles of these factors in relation to their coefficients and p-values and z-values to make judgement as to their significance levels and the nature of the relationships between market participation and each predictor variable. The positive sign of a coefficient indicates a positive relationship between market participation behaviour of the smallholder farmer and the independent variable. Which shows that if the value of the independent variable increases, the mean value of market participation would also likely increase and the opposite is true for negative coefficient Generally, the coefficient value implies how much the mean of the dependent variable changes given a unit change in the corresponding independent variable when all other variables are held constant.

The probit regression model was used to estimate farmers' market participation decision and the model was truncated to control for the degree of market participation of the smallholders. As can be seen from the Table 6.3, out of the 17 variables that were fitted in the model, results suggest that only 11 variables are the good fit for the model. This is confirmed by the likelihood ratio chi-square of 58.76 with a p-value of 0.0001, which indicate that the model as whole is statistically significant. The level of significance is

indicated by the asterisk (\*) on the P values. (\*) signifies the significance level at 10 percent probability, (\*\*) represents the level of significance at 5 percent and 1 percent significance level is shown by (\*\*\*)).

**Table 6.3 Determinants of market participation and level of market participation**

<b>Probability of participating in market (MP): Probit regression</b>				
<b>Variable</b>	<b>Coefficient</b>	<b>Std. error</b>	<b>Z</b>	<b>p&gt; z </b>
Gender	-0.0929	0.2757	-0.34	0.736
Age	0.4543	0.1101	4.13	0.000***
Age-squared	-0.0040	0.0009	-4.27	0.000 ***
Household size	-0.0374	0.0621	-0.60	0.547
Marital status	-1.0544	0.3723	-2.83	0.005***
Education	0.0012	0.0360	0.03	0.975
Primary occupation	0.3442	0.2742	1.26	0.209
Cultivated farm-size	0.4357	0.1468	2.97	0.003***
Distance to market	0.0078	0.0083	0.95	0.344
Access to extension services	1.4666	0.3336	4.40	0.000***
Access to financial supports	-0.0793	0.3688	-0.21	0.830
Membership of farmers' group	-1.1399	0.3386	-3.37	0.001***
<b>Degree of market participation (MPI): Truncated regression</b>				
	<b>Coefficient</b>	<b>Std. error</b>	<b>Z</b>	<b>P&gt; z </b>
Gender	0.05189	0.0301	1.72	0.085*
Age	0.0413	0.0139	2.96	0.003***
Age-squared	-0.0004	0.00012	-2.99	0.003***
Household size	0.0062	0.0062	1.00	0.318
Marital status	-0.00012	0.03688	-0.00	0.997
Education	-0.0018	0.0041	-0.43	0.665
Primary occupation	0.0603	0.0338	1.79	0.074*
Cultivated farm-size	0.1781	0.0205	8.71	0.000***
Distance to market	0.00016	0.0009	0.18	0.855
Access to extension services	0.0499	0.0417	1.19	0.232
Access to financial supports	0.1492	0.0428	3.48	0.000***
Farmers' group membership	-0.2732	0.0485	-5.63	0.000***
<i>Sigma Constant</i>	0.1841515	0.0102307	18.00	0.000

\*\*\* and \* - significance level at 1% and 10% probability respectively. Wald chi2 (12) = 58.76. Log likelihood = -14.13782. Prob > chi2 = 0.0000

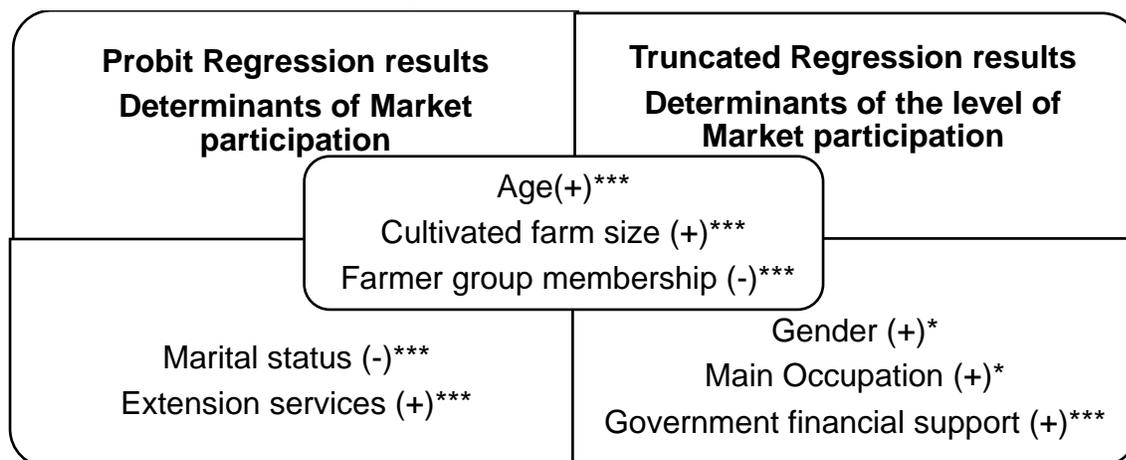
**Notes:** \*\*\*, \*\* and \* means significant at 1%, 5% and 10% levels, respectively

**Source:** STATA generated results from field survey, 2017

According to the results, the z-statistic and their associated p-values shows that with respect to farmers decision to participate in markets, only 5 variables namely; age, marital status, cultivated farm size, access to extension services and farmer association have the

$p < 0.001$  significance level. The result implies that when other factors are held constant, age, marital status, cultivated farm size, access to extension services and farmer association are 99% better in explaining the farmers' market participation decision. Gender, household size, education, primary occupation of the farmer, distance to output markets and access to government financial support, on the other hand shows a p-value higher than the usual significance level ( $p > 0.05$ ). This finding imply that these variables are not statistically significant in explaining the smallholder's market participation decision. However, it does not make the variables less important or do not have influence on farmers market participation decision-making behaviour.

Concerning the degree to which farmers participate in markets, p-values suggest that gender, age, main occupation of the household head, access to financial support and farmer association membership were the variables that most significantly (at  $p < 0.001$  for age, financial support and group membership and  $p < 0.10$  for gender and primary occupation of the household head) influence the volume the farmer would be willing to sell in the market. The significant factors of both the model of market participation and the level of market participation and their outcomes are shown in Figure 6.1 below.



**Figure 6.1 Determinants of Participation and Degree of Market Participation**

**Notes:** <sup>\*\*\*</sup>, <sup>\*\*</sup> and <sup>\*</sup> means significant at 1%, 5% and 10% levels, respectively

**Source:** STATA generated results from field survey, 2017

The figure presents the variables that were found statistically significant in market participation and the level of market participation. On the left side of the figure are the

factors for market participation while the factors for the level of market participation are shown on the right side of the figure. The intersection or inner box shows those variables that affect both the market and the level of market participation. The discussion of these variables follows in the following sections.

Each category of the factors affecting farmers' decision to participate in market will first present the significant variable and the non-significant variables afterwards.

### 6.3.1 Socio-economic and demographic determinants

The roles of gender, age, marital status, household size, education, and primary occupation of the household head, as well as the size of household in the decision as to whether or not to participate in output markets were examined. The results shows that age, marital status, cultivated farm size are significant determinants of market participants, the relationships being positive with age and negative with marital status.



- *Age of smallholder farmer*

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Age of the household head was to be statistically significant at 1% significant level ( $p < 0.01$ ) and positively related with the market participation decision of a household head. This finding imply that an additional year to the farmer's age is likely to increase the probability of market participation by 0.45. Meaning that as the household head grow older, they are more likely to participate in markets. However, when age is squared to accurately capture the effect of differing ages rather than assuming the effect is linear for all ages the result shows a negative coefficient but significant at 1% significance level ( $p < 0.01$ ). This finding indicate that as farmers get older up to a point and start to decline as farmers become older. This probably means that when farmers become quite old, they tend to be less and less productive and are unable to generate sufficient surpluses for the market. In such a scenario, it becomes more and more difficult for the very elderly farmers to explore market opportunities. It is probably also because such farmers have already largely passed the phase of their lives when they were the key breadwinners of the

household and shouldered more responsibilities for the upbringing of their children and general upkeep of the family.

Moreover, the fact that agricultural activities in the communal areas involve manual operations mean that only persons who are physically fit and strong can cope easily with such tasks given that limited resources put strict limits on how much hired labour they can engage (Dlova, *et al.*, 2004). Therefore, the fitting of a market participation function with age in a quadratic format, suggests that market participation increases with age and attains a peak value before it goes into a decline with increasing age. This reflects the realities of rural life in South Africa where farming is largely performed by very old and aging farmers while the youth seek lucrative opportunities elsewhere to improve their quality of life. For a fact, agriculture is not very attractive to young people in South Africa, relatively due to the perceived low status and lack of growth in career attached to farming (Woolard, 2013). The youth's perception of agriculture is a lot of hard work with little financial rewards, being scruffy and exposed in the sun, including being far away from the city centers where things are happening. The cause for urban-rural migration.

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- *Marital status of smallholder farmers*

The result on marital status of household head shows a negative and statistically significant outcome at ( $p < 0.01$ ). The coefficient of marriage indicate (-1.054) implies that married farmers are less likely to participate markets. This finding signify the different roles men and women play in the family. For example, once married, women assume their home caring responsibility (Ngomane & Sebola, 2016; Cunningham, Brown, Anderson & Tostao, 2008). Although women form the majority in agriculture, women tendency is to plant their crops for subsistence use to care for the feeding of the family (Akanle, Ademuson, Adegoke & Akewumi, 2019). Besides, women are often subject to unfavourable land control and rights, which deprived them opportunities for farming (Ramoroka, 2012). Men on the other hand, bear the role of providing for the family. To fulfil this role, as indicated earlier; agricultural production has not been commensurate with the financial needs of rural households (Obi *et al*, 2012; Matungul *et al.*, 2001), forcing men as income providers to look elsewhere for opportunities, which are more

rewarding and preferable than farming (Cheteni, 2016). Similarly, apart from the fact that the rural agricultural sector performs poorly for many to sustain life, the married men may also have the confidence to leave their wives at home to take care of the family while they migrate to urban centres for better opportunities.

Furthermore, Anukriti and Dasgupta (2017) suggest that a family is made up of individuals with diverse and different preference and desires to satisfy. Therefore, they are likely to face different influences or sometimes aspire to achieve different goals. This implies that husband and wife may not always agree and act collectively in production decision, which in turn reduces the likelihood of market participation.

- *Gender of household head*

Gender of household head was found to have a negative and non-significant influence on the farmers' decision to participate in the market. The coefficient of gender indicate that the participation of farmers/household head in markets is likely to decrease by 0.09 if a household head is a male. This finding may again imply as indicate above, men have the responsibility of providing for example income for the family needs. Therefore, to obtain a better living for their families, men engage in off-farm income generating activities. This claim was validated in Mujuru and Obi (2020) who revealed that indeed for rural households, non-farm income dominated the rural household income.

- *Household size*

The household size was found to have a negative and not significant influence on the farmers desire to participate in markets. The coefficient of this variable indicate that the additional member to the household is likely to reduce the probability of market participation by at least 0.4. The finding implies that the size of the household cannot be considered as a proxy of family labour, but rather as a variable representing the dependency ratio. The means that as the family grows larger, there are too many mouths to feed, as a result, the households fail to produce marketable surplus beyond their consumption needs (Siziba, Kefasi, Diagne, Fatunbi & Adekunle, 2011).

- *Education of the household head*

The results revealed a positive coefficient of the level of education towards the farmer's decision to participate in the market. The finding implies an additional year of schooling would likely increase their market participation by 0.1%. This result implies that farmers with a reasonable number of years of schooling are more willing to read and understand basic instructions (Moloi, 2008). This enhances their ability to search and access the market information and opportunities, they can network and communicate their business ideas, and as a result, they are likely to penetrate the market better (Randela *et al.*, 2008). However, the impact is negligible impact, justifying that majority of the rural population with better schooling are still seen migrating to urban centres for better opportunities.

- *Primary occupation of the household head*

The results revealed a positive relationship between the primary occupation of the household head and their decision to participate in output market. The result implies total dependency on farming and shows indicate that for farmers whose primary or main occupation is crop farming, they are much more committed and are more likely to participate in the market than those farmers who engage in farming activities as means to supplement their other major source of income (Muricho, & Obare, 2015).

### **6.3.2 The Role of Market Factors**

Cultivated farm size and distance to market were examined to determine their role in farmers' market participation decision. The size of area cultivated was found to have a significant and positive influence in the farmer's decision for market participation, while a negative and non-significant result was revealed on the role distance play in influencing farmer's market participation decision.

- *Cultivated farm size*

The size of the area under cultivation was found to have a significant (at 1% significance level) and positive impact in the decision for market participation of smallholder farmers. The coefficient of this variable indicate that an acre increase in agricultural land would increase the probability of market participation by at least 0.44. This finding implies that the larger cultivated area allows the farming household to have excess of their production above the subsistence needs resulting in increased surplus for farmers to sell in the market (Woldeyohanes, Heckelei & Surry, 2015; Randela *et al.*, 2008). This finding corroborates with Mujuru and Obi (2020), whom in their study attempted to establish whether the area under cultivation influenced food security and crop profits of the homelands smallholder farmers. Their findings confirmed that indeed, area under cultivation does have a significant influence on profitability of specifically cabbage as a cash crop. This also validates that government's effort for land redistribution and reform, although proven slow (Obi & Ayodeji, 2020), but it is indeed crucial if a meaningful and sustainable transformation of smallholder agriculture is to be achieved. Releasing agricultural land is therefore even more urgent for the rural homeland farmers who at present are farming mostly on food plots and homestead gardens (Obi & Ayodeji, 2020).

- *Distance to market*

On the role distance to market play on farmer's market participation behaviour, the results revealed that is a negative coefficient -0.15645 of distance to market. This result implies that a kilometre away from the agricultural markets reduces farmer's participation and therefore an additional kilometre would reduce their participation by 0.16. So the furthest the farmers are from the market, the less likely they would engage in markets.

### **6.3.3 Role of Institutional factors**

In this category, extension service, government financial support and farmer associations were examined to assess their relationship with the farmer's decision-making behaviour. Extension services and farmers organizations were found to have a significant on the

behaviour of farmers regarding markets and the provision of financial support was found to not significant and showing a negative impact on market participation.

- *Extension service*

The results revealed that extension service is statistically significant at 1% level and have a positive influence on the farmers' decision to participate in markets. The coefficient of this variable (1.467) implies that farmers who receive guidance and support from extension officers are 100% most likely to participate in market. This finding has proven that the provision of extension service is meaningful for the performance of the smallholders in markets. In line with Gani and Adeoti (2011), farmers who consult with the agricultural extension agents are more likely to benefit from agricultural interventions such as soil preparation, fertilizer use, seed subsidy, agricultural value chain mentorship and marketing information. This confirm that the role of extension services as delivery of information inputs to farmers can be relied on for market decisions by framers in the homelands of the Eastern Cape.



- *Farmer associations*

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In the literature, there is enough evidence in indicating the successes smallholder farmers achieve when they organize themselves in groups and collectively work together to overcome the marker barriers and penetrate markets (Gyau *et al.*, 2016; Etwire *et al.*, 2013; Randela *et al.*, 2012). However, the results of this study indicate otherwise. The results revealed that being a member in farmer associations or cooperative have a negative statistically significant (at 1% significance level) impact on farmers' market behaviour. That is, a farmer who are members in farmer groups or cooperative are less likely to participate in markets which may imply that farmers prefer to sell their produce independently of any association.

- *Government financial support*

The role governmental support in monetary terms was found to have a negative impact on the market behavior of poor rural smallholder farmers. This finding dismisses the idea

that agricultural growth through increased productivity, improved post-harvest and better access to markets can be achieved if smallholders are financially supported (Poole, 2017). Rather, funding from government encourages farmers to withdraw from markets and the question of whether they would have received the funds and how the funds were used deserve further interrogation.

The results show that the variables that influenced the likelihood of participation in output market among smallholder households in Qamata, Tyefu and Zanyokwe irrigation schemes include: gender, age, household size, marital status, education level of household head, primary occupation of the household head, size of area cultivated, distance to the nearest market, access to extension services, access to financial support and farmer group membership. Among these factors, age was found significant at 1 percent significant level ( $p < 0.01$ ) towards market participation. Marital status of the household head was also found significant at 1 percent significance level ( $p < 0.01$ ) towards participation in markets. The results also revealed the significant relationship between the size of cultivated farm area, this variable was also found significant at 1 percent significance level ( $p < 0.01$ ). Access to extension services was also found to be significant towards market participation at 1 percent significance level ( $p < 0.01$ ). Farmer group membership had also been found to have a significant influence (at 1 percent significance level) ( $p < 0.01$ ) towards market participation. These findings suggest that these variables are 99 percent better in explaining the farmers' market participation decision. The discussion of the variables is presented in the following sub-sections. The sub-sections start with the discussion of the significant variables followed by the discussion of all other factors of market participation.

#### **6.4 Determinants of the level of market participation**

The variables to predict the level of market participation include gender, age, household size, marital status, education level of household head, the primary occupation of the household head, size of area cultivated, distance to the nearest market, access to extension services, access to financial support and farmer group membership. Of all the

variables, gender, age, primary occupation of the household head, size of farm cultivated, access to government financial support and farmer group membership were significant variable. The detailed discussion of the factors affecting the degree to which the farmers participate in market is presented in the sub-sections that follow.

#### 6.4.1 Socio-economic and demographic factors

##### - *Gender of household head*

Gender of household head was found to have a positive and significant (at a 10% significance level) influence on the quantity that the smallholders would sell in the market. According to this study, this finding means that household heads who are males are more likely to sell more produce than when the household heads are women. This result confirms the findings in previous studies including Hlongwane *et al.* (2014) that being a male farmer increases willingness to participate in markets. According to Cunningham *et al.* (2008), this is because women prefer to store output for household self-sufficiency than to sell.



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##### - *Age of the household head*

The coefficient of age towards the extent of market participation was found statistically significant and positive at 1 percent significance level ( $p < 0.01$ ). The results confirm the findings in the probit regression of market participation. This finding also confirms the findings in Dlova *et al.* (2004) that the older the farmer, the more agriculturally inclined he or she becomes and so would the person be in market participation and towards the decision about how much of their product they should sell. However, as indicated, the older they become, the weaker they become. This means that it gets to a stage where they no longer have the physical strength and they become less productive in carrying out energy demanding agricultural activities. Moreover, Musah, Bonsu and Seini (2014) suggest that older farmers are more inclined to prioritize feeding the family than disposing of their produce in the market.

- *Primary occupation of household head*

The positive and significant (at a 10 percent significance level) relationship was found between the primary occupation of the household head and the volume of crops sold. This finding means that farmers whose primary occupation is crop farming are much more likely to convey more of their crops in the market than those who may have other jobs as their main source of living. This finding contradicts Muricho and Obare (2015) who found a negative relationship between the primary occupation of the household head and their market participation. However, the results confirms the findings in Gyau *et al.* (2016) and Muricho (2015) who also in their investigation found that farmers who practised farming as their primary occupation are more active in both market participation and the intensity of participation than those who had a different primary occupation mainly because they depend almost entirely on income from the farm.

- *Household size*



The agricultural activities are labour intensive and the larger the household size, the more advantageous it is for the family to execute its farm operations and market activities (Kristen & Van Zyl, 1998). The coefficient of the size of household indicate a positive response to the degree of market participation. This finding implies that the members of the household contribute to the family labour. Therefore, the larger the size of household the higher the intensity of market participation of the household head. This could also imply that the household is food sufficient thereby leaving the farmer with surplus output to sell in the market.

- *Marital status*

The findings revealed that marriage has a negative impact on the degree of farmers' market participation. This result fails to support the idea in Megbowon (2017) that marriage offers stability in farming. The results suggest that the married household head are more likely not to participate in agricultural markets. This finding confirms the results of the descriptive statistics, which revealed that more unmarried household than the

married household heads, dominated the sample. This may again imply that apart from the fact that the rural agricultural sector performs poorly for many to sustain life, the married households heads may also have the confidence to leave their wives at home to take care of the family while they migrate to urban centres for better opportunities. Furthermore, the result corresponds well with the findings in the sources of income, where remittances seem to be reported as the highest source of rural household income.

- *Education of household head*

The results revealed the negative relationship between education of the household heads and the quantity of output they sell in the market. This observation contradicts the prior expectation of the study. Educational attainment contributes to the knowledge the farmers can use in their farming activities and acquisition of relevant market information. However, these findings suggest that the more educated the household head would be, the less likely are they to participate in the output market. Similarly, the quantity they would decide to sell in the market would be correspondingly limited. This may imply that with more education, household heads would find living in economic activities other than agriculture (Lapar *et al.*, 2003).



#### **6.4.2 Market factors**

The role the cultivated size of farm, and distance to market play in the decision on the volume of marketable output was assessed. The cultivated farm size was found to have a significant a positive response in relation to explaining how much of the surplus crops the farmer is likely to market.

- *Size of cultivated area*

Area cultivated was found to significantly (at 10% significance level) and positively influence the degree of market participation among the smallholders. This finding supports the probit regression results and consistent with the findings of Woldeyohanes *et al.* (2015), Hlongwane *et al.* (2014) and Randel *et al.* (2014). The findings imply that the

bigger the area cultivated is, the more the production, which leads to increases in the total volume of the surplus produce that a household would sell in the market. Hence, Hlongwane *et al.* (2014) suggests that the inaccessibility of land is a major hindrance against farm production and consequently market participation, suggesting the necessity for a review of the process of allocating land to farmers.

- *Distance to market*

Although not significant, the coefficient of distance to market revealed a positive relationship between distance to market and the degree of market participation. This means that farmers facing relatively longer distance are more likely to be commercial farmers. This finding is consistent with the probit model result and once again, the result confirms the finding in Randela *et al.* (2008), Asayehegn, *et al.* (2011) and Buckmaster (2012) who suggest that although the furthest distance increases the transaction costs, that distance to market may not have an impact on the volume of sales. Rather, these authors believe that quality may be more important as a determinant of market participation. This means that the amount of crops sold is not charged by the distance the farmer would have travelled but by the quality of the produce. Going by those insights, the study rejects the hypothesis that the proximity of farmers to markets would enhance the degree to which smallholders in the Qamata, Tyefu and Zanyokwe areas participate in markets.

### **6.4.3 Institutional factors**

On the role of institutions on the degree of market participation, the provision of extension service, government funding and farmer associations were examined. The results indicate that access to government financial support and farmer associations have a significant impact on the level of market participation.

- *Access to government financial support*

Farmers' access to financial assistance is a significant (at 10 percent significance level) and positive factor determining the extent to which a household head would sell their crops in the market. This means that for those farmers who decide to participate, the financial intervention enhances the opportunities for increasing the quantity they sell in the market. This finding validates the study hypothesis that financial support enhances farmers desire to sell more of their product in markets. The result also corroborates with the descriptive findings of the study, which revealed that at least 73 percent of the farmers have received financial assistance. The result also confirms the findings in Jari (2012) and Goodwin *et al.* (2008).

- *Farmer group membership*

As in the probit model results, being a member of a cooperative was found to be likely to have a negative and significant (at 1% significance level) influence on the degree of farmers' market participation. As indicated earlier, this finding contradicts numerous findings in previous studies including Simelane (2011), which may imply that such farmer association activities may be limited to farming activities and does not carry out the marketing activities on behalf of the farmers. Rather, the farmers act independently in accessing markets. Based on this finding, the study, therefore, rejects the hypothesis that farmer group membership will enhance the extent to which farmers would participate in the market.

- *Access to extension service*

Access to extension services was found to have a positive (at a 1% significance level) influence on the degree of market participation. This finding implies that there more farmers are provided with the advisory services by extension officers, the more they are encouraged and motivated to be more market oriented and increase their crop sales. This finding confirms the crucial role the extension officers paly in smallholder farming as sources of market information. According to Adebayo, babu, Sanusi and Sofola (2015), the extension service objective is to share knowledge to influence the decisions and practices of large numbers of rural farm households so that the farmers are either commercial or food secure. The result further confirms that indeed farmers who consult

agricultural extension agents are more likely to benefit from agricultural interventions (Agricultural Value Chain Mentorship Project, AGRA Soil Health Project, Block Farm, Fertilizer and Seed Subsidy) (Gani & Adeoti, 2011).

The findings of market participation model and the extent of market participation imply that the factors affecting farmers' decision to participate are the same variables that affect their decision about the quantity to sell in the markets, although, the significance of their impact differ statistically. Except that, the farmer's decision to participate in the market is highly influenced negatively by their marital status and the provisions extension advisory services. That is, farmers who are either never married, divorced or widowed are the most likely to participate in the market than the married farmers.

The extent of market participation, on the other hand, is more male oriented, and depend highly on farmers being full time farmers and receive government financial support. Generally, it was established from the results that although farmers in the Qamata, Tyefu and Zanyokwe areas still face challenges regarding the markets, they are gradually coming out of the subsistence farming to a more market oriented farming. To substantiate this, the MPI revealed that 69.5 percent of the farmers have sold between 26 to 50 percent of their produce as at the time of the survey.

## **6.5 Summary of the Chapter**

Estimation of the probit model revealed that age, marital status, farm size cultivated, access to extension services, membership of farmers group are the variables that significantly influence the farmers' decision to participate in the market. When the truncated model was fitted, the results revealed that the decision on how much to sell in the market relate significantly with gender, age, primary occupation of household, farm size, financial support and membership of farmer group. Factors such as education, occupation as well as whether the farmer had received extension support validates the prior expectations of the study. On the level of participation, size of a household, the primary occupation of the household head, size of farm, receiving extension service and

financial support had also confirmed a priori expectation of the study. Based on the findings of the study, the null hypothesis was rejected.

Although smallholders in the study area still face challenges with scaling up their production to meet the market demands, the computed score index indicated that sampled smallholder farmers have gradually transited from subsistence to the semi-commercialised level. However, farmers still consume the bulk of their farm output, hence, commercialisation remain sluggish.



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## CHAPTER 7

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# IMPACT OF MARKET PARTICIPATION ON WELFARE OF SMALLHOLDER FARMERS

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### 7.1 Introduction

This chapter answers the question as to whether participating in markets has had the desired outcome of improving the welfare of the sampled farming households. The basic idea is to determine the change and establish whether there are greater payoffs resulting from market participation. The semi-parametric tool employed to carry out this assessment is the propensity score matching (PSM) method which is justified by the fact that there was no pre-market (i.e. baseline) information about the sampled farmers, that is, the “missing data problem” or the “evaluation problem”, making it difficult to estimate the impact market participation may have had in their household incomes as the outcome of interest. Participation on the programme produces an observable factual outcome while non-participation produces a counterfactual outcome but which cannot be observed because it did not happen. However, to accurately measure the impact of participation, there has to be a way to estimate the counterfactual outcome. PSM construct a comparison group of non-participants with characteristics similar to those of the sampled farmers to determine the state the participants would have been at had they not participated. The results are presented and discussed in this chapter.

### 7.2 Farmers’ selected characteristics and PSM

The first step in the estimation of the market participation effects was to select the covariates likely to predict the likelihood of market participation. The independent variables (gender, age, level of education, marital, household size, primary occupation, cultivated farm, and distance to nearest market, provision of extension service, government funding/financial support, and farmer group/associations) were fitted in the

probit model to estimate the probability of participating in output markets. The probit regression results are presented in Table 7.1.

**Table 7.1 Probit Estimates for Participation in Output Market**

Market Participation	Coefficient	Std. error	Z	p> z/
Age	0.4606	0.4888	0.94	0.346
Age-squared	0.3819	0.1761	2.17	0.030**
Household size	-0.0033	0.0015	-2.18	0.030**
Marital status	0.0197	0.1384	0.14	0.886
Education	-0.1234	0.5958	-0.21	0.836
Primary occupation	0.0424	0.0647	0.66	0.512
Cultivated farmland	0.5059	0.4990	1.01	0.311
Distance to market	0.4084	0.2435	1.68	0.094*
Access to extension services	0.0017	0.0141	0.12	0.901
Access to financial support	2.5133	0.6660	3.77	0.000***
Farmers' cooperative group	0.2821	0.6923	0.41	0.684
Constant	-2.8021	0.7889	-3.55	0.000***
	-8.8576	5.0652	-1.75	0.080
No. of Observations	209	LR chi <sup>2</sup> (12)		52.71
Log likelihood	-61.3812	Pseudo R <sup>2</sup>		0.3004

**Notes:** \*\*\*, \*\* and \* means significant at 1%, 5% and 10% levels, respectively

**Source:** STATA generated results from field survey, 2017

The probit regression revealed that age, cultivated farm size, extension service and farmer groups or associations were the significant determinants of market participation. The coefficient on age was significant (at 5% alpha level) and positive, indicating that participation in output markets and age of household head have a positive relationship. This implies that as household head grows older, they are likely to participate more in markets. However, the coefficient of age was negative and significant, indicating an inverse relationship between market participation and age squared. This implies that as farmers get older, their market participation declines.

The cultivated farm size was found to have a positive and significant (at 10% alpha level) influence on market participation. The finding indicates that the larger the size of cultivable area the more likely the household head will produce beyond feeding the household and

will likely have increased marketable surpluses. This implies that the probability of participation in markets increases as area under cultivation increases.

The results also revealed a positive and significant influence of access to extension services on market participation. The variable was found significant at 1%, implying that the household head who receives or had received visitations, support and guidance from extension officers is more likely to participate in markets than those that did not have such contact with the extension services.

Membership in farmer associations or groups was found negative and significantly (at 1%) related with market participation. The implication of this relationship is that belonging to farmer groups or associations does not have any influence on farmers' decision to participate in markets.

According to the foregoing results, the probability of market participation is conditional upon the household's age, farm experience (to a limited extent), cultivated farm size, access to extension services and membership of farmer associations. Selection of these covariates was expected to produce quality propensity scores, which can be used to construct a comparison group of non-participants.

### **7.3 Propensities matching and participation effects on the smallholder income**

Ideally, it would be expected that the average household income of participants in markets must be higher than the income of non-participants. However, this may not be guaranteed because there could be other factors that may have influence on household income other than markets. To draw such an inference, the propensity score estimates were used to match the participant group with the non-participant groups based on the background characteristics established in the prior probit modelling. This procedure allows for balancing of the further examined to find a balance and reduce selection bias. Balancing of the propensity scores was performed to ensure the even distribution of the covariates between the treated and untreated groups. This is achieved where the region of common

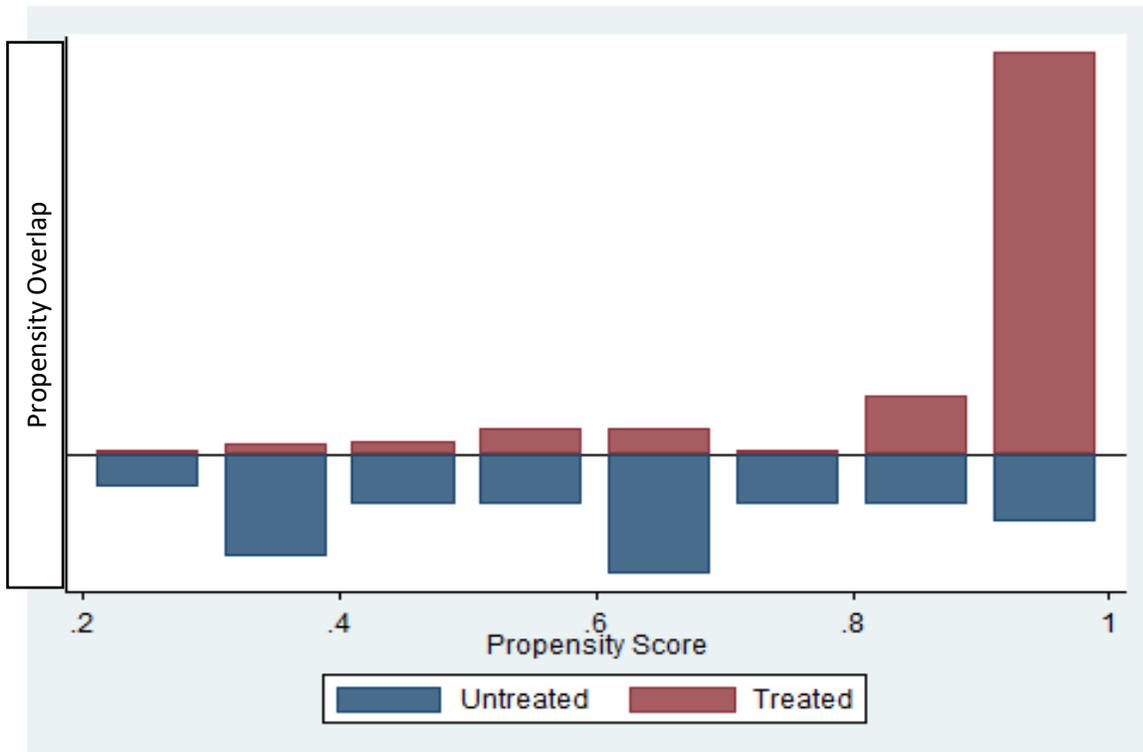
support is established. Table 7.2 provides the description of the estimated propensity scores from which the common support region is identified to match the market participants and non-participants' groups.

**Table 7.2 Summary of Estimated Propensity Scores**

	Percentiles	Smallest		
1%	.28	.28		
5%	.41	.24		
10%	.55	.28	Observations	209
25%	.80	.31	Sum of Wgt.	209
50%	.95		Mean	.86
		Largest	Std. Dev.	.19
75%	.97	.99		
90%	.98	.99	Variance	.04
95%	.99	.99	Skewness	-1.51
99%	.99	.99	Kurtosis	4.17

**Source: STATA generated results from field survey, 2017**

From the Table, the common support option has been selected and the region of support is [0.28, and 0.99] with a mean value of 0.86. This range marks a region within which the propensity scores are distributed, any scores that falls outside, either less or beyond the range are not considered for the matching exercise. This means that participants outside this range could not be matched, therefore, they cannot be used for estimation as they contribute to bias in the estimation of treatment effects. Treatment effect can only be estimated within the common support region (Bryson, *et al.*, 2002). In addition to numeric comparisons of balance, the quality of the matching process was further checked through a visual check of the propensity scores. Figure 7.1, is a histogram showing the distribution of the propensity scores of both the treated and controlled groups, indicating whether there has been sufficient overlap between the treated and control groups (Caliendo & Kopeinig, 2008).



**Figure 7.1 Propensity Score Distribution and Common Support Requirement**  
**Source: STATA generated results from field survey, 2017**

The figure confirms the distributions of propensity scores between participants and non-participants. The horizontal and vertical axes indicate the estimated propensity score and observed frequency of observations (Hoken & Su, 2015), respectively. The densities of the estimated propensity scores and the observed frequency of observations are shown on the horizontal and the vertical axes, respectively. The upper part represents the participants (treated) and the bottom half represents the non-participants (control group/untreated). The distribution of the covariates shows that the mean propensity score of the participants is not different from that of the non-participants. The quantiles indicate that there is substantial overlap in the distribution of the propensity scores of both participant and non-participant groups. The common support condition is therefore satisfied. This implies that the match was found and the observation falling within the common support region can be used to estimate ATT.

Once balance was achieved on the propensity scores and covariates, matching methods were employed to compare the groups and determine market participation effects on

welfare of smallholder households. The nearest neighbour matching algorithms was used, where each propensity score of the participants in output market was matched to the nearest propensity scores from the non-participants and then averaged. A sum of the entire propensity scores were calculated and matched with the household asset-based income as shown in the Table 7.3. Any differences found within this matched sample approximates the impact of participating in crop output markets and the difference is equal to Average Treatment Effect on the Treated (ATT).

**Table 7.3 Estimated Impact (ATT) Nearest Neighbour Matching**

Outcome variable: Income						
Mean outcome variable based on matched observations						
	Sample	Participants	Non-participants	Difference ATT	Std. Error	T-value
	Unmatched	2662.44	2300.46	361.98	473.00	0.77
	ATT	2662.44	1824	838.44	-	-
	ATU	2300.46	2933.33	632.88	-	-
	ATE	-	-	807.95	-	-

Note: \*Difference is the average treatment effect for the treated, ATT reported in Rands

Source: STATA generated results from field survey, 2017

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The Table 7.3 presents the ATT, ATU and ATE estimates for participation in output market. The breakdown of the matching estimates as shown in the Table 7.3, shows participation in output market (that is, ATT which is the Average Treatment on the Treated (that is those who actually participated in output market) had a positive impact on the welfare of the smallholder households. Based on the results, the average treated treatment was positive and estimated as R838.44. According to this finding, this is the least amount of income a farmer could earn from market participation. However, the result is not statistically significant meaning the amount may not make participants be very different from the non-participants. This finding corroborates with Lubungu (2013) who established that in Zambia, participation in crop output market increased the household income by about 52 to 64 percent on average.

These finding points to the fact that, there is an observed positive impact of the market participation on smallholder households' welfare but this effect is not statistically significant due to peasant farming status of the smallholder households in the study area.

#### 7.4 Post-matching and credibility check

It is important to assess matching quality by checking the balance of distribution of relevant variables in the treated and the control groups. This was to evaluate the magnitude of bias and any improvement after propensity score matching. Differences in the likelihood of market participation between the groups indicating bias because of self-selection problem were then compared using an independent samples *t*-test. Table 7.4 below presents the results from covariate balancing tests before and after matching.

**Table 7.4 Mean difference in Farmers Characteristics for Treated & Untreated**

Propensity scores	Mean		%bias	t-test		V(T) / V(C)
	Treated	Control		t	p> t	
Gender	0.63	0.33	60.0	5.87	0.000	1.05
Age	61.11	55.37	39.3	4.95	0.000	1.42*
Age-squared	3874.5	3164.5	42.0	5.21	0.000	1.36*
Household size	4.54	2.59	86.0	7.58	0.000	1.16
Marital status	0.66	0.22	91.2	9.24	0.000	1.28
Education	7.20	7.27	-1.9	-0.22	0.826	2.01*
Primary occupation	0.73	0.41	67.5	6.43	0.000	0.81
Cultivated farmland	1.20	1.64	-34.6	-4.12	0.000	1.49*
Distance to market	22.91	15.94	39.7	5.15	0.000	4.67*
Extension services	0.5	0.76	-61.6	-5.36	0.000	1.39*
Gov. financial supports	0.73	0.87	-31.6	-3.36	0.001	1.75*
Farmers group membership	0.62	0.90	-70.8	-6.71	0.000	2.73*

\* if variance ratio outside [0.74; 1.34] \*\*\* 1% Significance Level

Ps	R <sup>2</sup>	LR chi <sup>2</sup>	p>chi <sup>2</sup>	MeanBias	MedBias	B	R	%Var
0.477	235.37	0.000	63.8	60.0	200.4*	1.10	69	

\* if B>25%, R outside [0.5; 2]

**Notes:** \*\*\*, \*\* and \* means significant at 1%, 5% and 10% levels, respectively

**Source:** STATA generated results from field survey, 2017

Table 7.4 present the matching results between the participants and non-participants in output markets. is a propensity score showing percentage bias among the specified and observable characteristics of. Respectively,  $V(T)$  and  $V(C)$  represents the variance ratio on the treated and control group. The significance level of the p-values indicate the degree of mismatch in the covariates.

## 7.5 Summary of the Chapter

The important question this chapter sought to address was whether participation of smallholders has had beneficial effects on their wellbeing. Evaluation of the impacts was done using the semi-parametric propensity score matching. In the process of estimating the effects, the probit regression was used to select the farmer characteristics and predict the probabilities of participation of the non-participants. Several tests were performed to examine whether the predicted propensity scores were suitable for estimating the market participation effects. Once the common support requirement was satisfied, ATT was estimated using the nearest neighbour matching method and a positive ATT was revealed. From the results, it was concluded that although not significant, participation in output markets does increase incomes of the households that participate in markets. The next chapter summarises the findings and concludes the study.

## CHAPTER 8

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### SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

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#### 8.1 Introduction

This chapter provides a summary and conclude the research efforts of the study by reviewing how the techniques applied addressed the overall aim of the study. The chapter is divided into four sections. The second section 8.2 of the chapter provides a summary of how each chapter of the study contributed in addressing the main research question. Section 8.3 draws conclusions and make recommendations for policy and future research.

#### 8.2 Summary of the study

The overall aim of the study was to examine the smallholder farmers' behaviour towards output market, to measure their level of progress in achieving commercialisation and to compute the measurable improvements in the welfare of smallholder households because of market participation. Given the considerations for the sector's specific role in rural livelihoods and in realisation that all efforts against poverty, unemployment and food insecurity have failed, in its priorities, the South Africa government accelerated programmes placing smallholder agriculture at the forefront of development. Productivity and access to markets became a clear-cut pathway to achieving both commercialisation, poverty reduction and empowering its people for self-dependence and sustainability. However, a bulk of recent literature shows that commercialisation has produced little or no improvements for the rural poor. Different studies have tried to investigate the reasons and in the process, they identified several different factors that contributed to specifically, the slow progress of smallholder commercialisation. What is missing is how far they have gone in the process of commercialisation, including how much benefits accrued because of market. This is what the study endeavoured to explore. It was therefore, necessary to undertake this study in endeavours to establishing measurable evidence of how much

progress, smallholders have made in the line of commercialisation and how their lives have changed as a result. This information will have important practical implications for policy regarding appropriate pathways for poverty alleviation and livelihoods improvements in the rural of the Eastern Cape Province. Most importantly for policy makers to assess whether commercialisation of farming rural households is worth the investments.

### **8.2.1 Summary review of literature**

Poverty remain rife in South Africa despite the efforts to eliminate it. The severity of its impacts have hit hard on the rural households who depend mainly on social grants and remittance income. The challenge for South African is how the rural households can be supported in establishing viable rural livelihoods and eventually escape poverty. Smallholder agriculture is the mainstay of rural livelihoods where poverty is deep. Despite its minimal contribution to the economy, smallholder agriculture provides food and employs 25% of the country's economically active persons. Hence, the call by the international community for developing countries to develop strategies and programmes to integrate smallholders into mainstream economy. There is enough evidence from around the world showing that if appropriately supported, smallholder agriculture has a potential to reduce poverty and improve welfare through incomes generated from the markets. In countries like Zambia, not only does agricultural activities increase household income twice as much, it has also reduced gender disparities in the distribution of income.

The contribution of smallholder farmers to development and rural livelihoods is dependent on their level of transformation and adoption of the more advanced technologies. The advances production technologies would improve their productivities and production beyond food supplies. It also depend on their readiness to participate and extend which they participate in of markets. Markets for smallholders allow them to sell their surplus and increase their incomes and eventually, improvements in their welfare levels. Although farmers face the market challenges that are sometimes beyond their control, the international experience has taught us that commercialization is indeed an indispensable

pathway towards achieving rural economic growth and liberating farmers out of poverty. However, their success depend on their level of connectivity to markets.

As a source of rural livelihood, smallholders contribute more to household food security, particularly in staple foods, which provide little opportunities for markets. In their nature, smallholders are producers and consumers of their own output. They consume a greater portion of their produce, meaning that it is only when their home consumption is satisfied that a smallholder will sell the surplus. As a result, they remain locked in their unproductive subsistence agricultural activities. This is because smallholders operate in low yielding agricultural activities associated with lower risk, which subsequently, affect their farm productivity and thereby, limiting the marketable surplus. On the other hand, market imperfections and high transaction costs, poor access to finance including the delayed restitution of land, including their perceived lack of entrepreneurial spirit, and market participation remain implausible.



The study applied the simple agricultural household model. The model addresses the underlying issues smallholders have to consider where they have to make choices and they face constraints. As peasant, farmers are conflicted between two decisions, either they participate in market or not and about the volume they have to sell. The model emphasizes that decision makers always chooses the alternative offering the greatest utilities. In the light of commercialisation, a smallholder farmer will choose to maximize profit only when they first have to meet the minimum quantity of food required by the family. This means that modelling of a farming households' behaviour, the decisions are non-separable and interdependent, subject to a number of factors including cash constraint, production, and the choice of technology and labor allocation.

### **8.2.2. Summary of the methods of analysis**

The study was carried out in Qamata, Zanyokwe and Tyefu irrigation schemes in the homelands of the Eastern Cape Province. The schemes were purposely selected because, besides being operational, they are considered the largest smallholder irrigation

scheme in Province that had undergone the revitalisation programme. It, therefore, was necessary to make a follow up on the changes on the beneficiaries after all the efforts. A multi-stage sampling procedure was followed for selection the respondents. A total of 210 smallholder irrigators were interviewed by means of a close-ended questionnaire. Data were collected using structured questionnaires and face-to-face interviews.

For the analysis of the collected data, the study employed the descriptive analysis, the multiple-level choice models and the Propensity Score Matching (PSM) technique to respectively, present the demographic characteristics of the smallholders and, to analyze their market participation decision-making behaviour, the level of market participation, and their welfare improvements post-market participation.

### **8.3 The Socio-Economic characteristics of smallholder farmers**

The analysis of the socio-economic characteristics of the smallholder farmer was done to understand who the farmers are. The study found that majority of the sampled smallholder farmers were male, were at the average age of 61 years, majority of them were not married and they lived a household with at least 5 members. Majority of them have at least 7 years of schooling, they participate in farming as their main occupation but majority of them depended on social grant and remittances for most of their income and their average monthly income was R2600.00. The study found that farmers cultivate on 1.2ha of farmland, they do not have their own transport and they have to travel about 23km to get to markets. Majority of the farmers had received financial support and input use training from government and majority of them had registered in farmer groups or associations.

In terms of production, maize and potatoes were the most grown crops in the areas but cabbage and potatoes are the most sold in the markets. This finding can be explained by the fact that maize is staple crop, while potatoes and cabbage are used only to supplement maize as the main dish. Therefore, it make sense that maize would be

reserved for home consumption. The study also found that majority of those who participated in markets; they can get R8680.00 from the sale of their crops.

#### **8.4 The extent of market participation of the smallholder farmers**

The study identified that about 44% of the sampled farmers participated in markets and they sold at least 55% of their farm produce. This finding suggest that farmers have moved from the pure subsistence system of farming as they sell at least a half of their farm produce. However, an aspect deserving further investigation is the fact that, this outcome may not necessarily mean that farmers are food sufficient. In that light, that farming is the primary occupation for most farmers and they are households whose responsibility is to provide for the family, no matter the level output, farmers would sell to a portion of their output just to meet other household necessities.

#### **8.5 Determinants of the level of market participation**

Market participation and the level of participation is highly associated with age of the household head but when age is squared, farmers can only participate to their peak age 61 years and participation begin to decline gradually as they grow older and older. It was also found that marriage discourages participation in markets. Participation in market was also found to increase with the size of the area under cultivation and receiving guidance from the extension officers. Being male, working as a full time farmer and having access to government funding was found to have a positive influence on the volume of output. It was found that being a member of farmer association or group, has a tendency of reducing both participation and the volume sold in markets.

#### **8.6 Impact of market participation on smallholder household welfare**

The impact evaluation process through the propensity score matching, which estimated the average treatment effects of the market participants ATT, revealed that farmers who participated in output markets were at least R838.44, better off than their counterparts

were. Which meant that there was an improvement in their household income and consequently, their wellbeing. However, the difference was found not very significant, and this can be explained by the fact that for farmers whose primary occupation is agriculture with no other source of income, considering the severity of poverty in the study area, R800.00 is not enough even for basic food needs. It is equally difficult to reinvest in agricultural activities. Hence their dependency on external financial support. This finding is interesting because it confirms that social grant is indeed the dominant source of income for these rural households.

## **8.7 Conclusion and Recommendations for policy**

This study acknowledges the important role of commercialization to smallholder development as a means to fight poverty and to contribute to rural economic development and inclusive pro-poor growth. However, smallholder farmers in the homelands of the Eastern Cape Province still face different numerous challenges pertaining to market accessibility and participation. Farmers' market participation remain low. Although smallholders in Qamata, Zanyokwe and Tyefu sell a half of their produce, it is difficult to conclude that these farmers are semi-subsistence because many of them depend entirely on farming for their livelihood and source of income. Household needs are not only limited to food sufficiency but income is needed for other products they cannot produce themselves. Concisely, farmers sell part of their output, not because they have enough, rather, farmers were pushed by their circumstances. Besides, commercialisation can only occur if household food is in surplus. Given the widespread challenges smallholder farmers faces in terms of making means to survive, they most likely sell their produce to meet other households needs which they cannot produce but not out of surpluses. Commercialisation also requires improved productivity and effective market participation.

Our analysis show that smallholders who participated in markets have significantly higher income than subsistence oriented ones. However, the R838 is below the national poverty line. For farmers who depend only on agriculture, as their main source of living, in the absence of other economic activities, this amount does not meet their entire household

needs. It therefore does not translate into meaningful outcomes in the wellbeing of the smallholders. Hence, they continue to live in poverty. This implies that agricultural income is not reliable and sufficient as the means for living, commercialisation has not translated into any significant changes in the lives of rural smallholder households, and farmers continue to live in abject poverty. It can therefore be suggested that rural households need to diversify options that augment their incomes, while agricultural production remain the source of food supplies.

The question as to whether investments in commercialisation of rural smallholders was worthwhile remain an equivocal and worrying concern of policy framework, especially if government has to continue supporting farmers yet the mismatch between farmers' yields and market participation persists. One thing is also clear, although government can assist smallholders by providing adequate access to production resources among which include: access to bigger farmland, fertiliser, pesticides application and extension services, market-oriented farming cannot be based on input support without farmers being capacitated for the after-harvest. Studies have shown that in the end, input subsidy is tend to not be sustainable and can also be costly, translating into low productivity and poorly affect incomes. If farmers' productivity remain low and markets do not exist, then commercialisation remain a farfetched dream for rural farmers, resulting in increasing hardships given the lack of economic activities in rural areas. This means that policy initiatives that target smallholders must be focused on improving their productivity benchmarks by providing appropriate management practices and innovation trainings that will improve their technical efficiency, scale and scope of economies. Moreover, partnerships with public and private enterprises can play a significant role in the supply chain particularly where farmers are limited in their ability to reach the markets including their difficulty in guaranteeing the quality standards of their produce.

Based on the findings of this study, agricultural production in rural areas also continue to remain in the hands of the elderly people, while it remain unappealing to the youth. Young people's aspirations are not just about economic opportunity, their status within society is important and agriculture does not bring status, regardless of economic outcomes. The

challenge for the elderly is that agricultural activities are demanding and need the physical strength. The elderly people lack the energy required and viable markets are mostly available in urbanised towns, which makes it almost difficult for the elderly farmers to explore. This gives an indication that while there is a need for government to improve the socio-economic conditions surrounding smallholder farmers, there is also urgent need to establish the localised and functioning market centres to provide a focal point and a convenient location where traders can meet with farmers. This is particularly beneficial for both farmers and traders as it would likely reduce the costs of transporting produce from the farm to the retailers, and for travelling from farmer to farmer to buy small quantities.

The findings also revealed confirmed that agricultural land remain an integral and significant factor for agricultural commercialization. Crop farming, especially grain crops like maize and beans require sufficient amount of land. Smaller land size results in low farm output and small surplus, thus allowing farmers to sell only a small part of the yield and only realize a meagre revenue. The challenges with land does not only rest with the slow pace of land reform but also the restrictive tenure system which is primarily influence by traditions and customs does not allow farmers to expand their land holding. In South Africa where there is an on-going land restitution, then releasing land is even more urgent for these rural farmers who at present lack land rights and are mostly farming on communal land or on food plots.

## **8.8 Limitations and Recommendations for further Research**

The study applied the household commercialization index (HCI) as a measure of the level of smallholder's commercialization. The index, however, does not make a meaningful distinction between a farmer who produces one bag of produce and sells that one bag so that HCI equals 100; it is misleading to conclude that such a farmer is fully commercialized while the farmer who grows 50 bags and sells 30 of the bags is considered less so. HCI is just one of the basic indicators of commercialisation. There are undoubtedly alternative measures of commercialisation which could be applied in the study. The study was limited

in that respect and therefore it is recommended that other measures of commercialization should be explored to clearly indicate the qualifying amount of output on the basis of which farmers can be classified.

Agriculture has mostly been seen as the key to rural economic and people development simply because most rural households are engaged in agriculture. Hence, considerable efforts are devoted to improving farming practices to increase productivity and profitability of smallholders. But because households engage in farming does not mean that they are equally passionate about it and will respond to incentives to the same degree to improve their productivity. Thus, interventions will necessarily generate different effects on different farmers and households. Pursuing commercialisation single-mindedly as the only goal of agricultural development and as one that is shared by all households while ignoring the myriad farmers' desires above and beyond farming does not help in understanding the low participation levels of smallholders. There is limited understanding of farmers' aspirations and their implications on their choices for commercialisation. Further analysis exploring this aspect in more details is therefore recommended for further research.



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## APPENDIX: QUESTIONNAIRE

University of Fort Hare, Faculty of Management and Commerce  
Department of Economics

### Smallholder Development and participation in output market in the Eastern Cape Province of South Africa

The main aim of the study is to assess the progress that has been made into achieving commercialisation of smallholder crop farmers and constraints to realization of the goal as well as assessing if smallholder agricultural development can be an engine of growth and poverty reduction in rural areas of the Eastern Cape Province.

**Researcher: Mahali E. Lesala (200396587)**

Questionnaire no. ....Village Name-----; Village No.-----; Household No.-----; Enumerator Name-----

Information below must be provided on the basis of the last farming season (not more than a year ago).

- I. Did you do any farming on the small scale irrigation schemes? 1. Yes [  ] 2) No [  ]  
 II. Do you own a homestead food garden? 1. Yes [  ] 2) No [  ]  
 III. Do you own both Homestead garden and Irrigation plot? 1. Yes [  ] 2) No [  ]  
 IV. How long have you been farming? \_\_\_\_\_

### 1. HOUSEHOLD COMPOSITION AND CHARACTERISTICS

1.1 Household size \_\_\_\_\_

1.2 Position in HH (other, specify)	1.3 Gender 1-Male 2-Female	1.4 Age	1.5 Marital status 1- Single 2-Married 3-Divorced 4-Widow	1.6 No. Children Born	1.7 Number of years spent in school	1.8 Main Occupation 1-Farmer 2-Wage employment 3- unemployed 4- Other
Head						
Spouse						
Other						


## 2 RESOURCES/ASSETS OWNERSHIP AND ACQUISITION

2.1 Do you own any of the following?

Resource/Asset	2.1 1. Yes 2. No	2.2 No. owned/available	2.3 Method acquired 1. Purchased 2. Inherited 3. Rented/Hire 4. Other ....	2.4 Ownership/Rental period
Modern house				
Livestock				
Own Transport				
Tele/cellphone				
Farm equipment				

2.5 What is the main source of labour? 1) Family labour [ ] (2) Hired labour [ ] (3) Both [ ]

## 3 LAND OWNERSHIP, ACQUISITION AND UTILIZATION

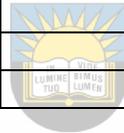
3.1 Do you own or have any land available to you? 1. Yes [ ] 2) No [ ]

Farmland type	3.2 Area size (Ha)	3.3 Area cultivated (Ha)	3.4 Method acquired 1-inherited 2-purchased 3-Rented 4-allocation by chief/PTO 5-communal 6-tenure	3.5 Available for how long (yrs) 1-Forever 2-As long as able to farm 3- Few years	3.6 Amount paid for land (rand)	3.7 Period of payment 1-once off 2-monthly 3-yearly
Rain fed arable						
Irrigated arable						
Total						

#### 4 FARM PRODUCTION INFORMATION AND MARKET ACCESS

How much of the following crops have you harvested in the past 12 months?

Crop	4.1 Area cultivated		4.2 Quantity produced	4.3 Unit measure
	Irrigated	Rain fed		
Maize				
Beans				
Spinach				
Cabbage				
Potatoes				
Carrot				
Pepper				
Tomato				
Butternut				
Pumpkin				
Onion				
Other 1				
2				
3				



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4.7 Do you sell any produce from your farm 1) Yes [ ] 2) No [ ]?

If yes to 4.7, to whom and where?

Crop	4.4 Quantity sold	4.5 Unit price/cro p	4.6 Amount realized	Crop sold	
				To whom	where
Maize					
Beans					
Spinach					
Cabbage					
Potatoes					
Carrot					
Pepper					
Tomato					
Butternut					
Pumpkin					
Onion					
Other 1					
2					
3					

**Where**

1. Town
2. Township
3. Village

**To Whom**

1. Individual
2. Large-scale farmer
3. Middleman/traders

4.7.1 What is the nearest urban center

4.7.2 What is the distance to the nearest urban center from your village

4.7.3 Is there a market center in the village? 1) Yes [ ] 2) No [ ]

4.7.4 What is the distance to the nearest market?

**5. HOUSEHOLD INCOME, SOURCES AND SPENDING**

5.1 In the last 12 months, how much were the HH cash income and sources?

Sources	Crop	Livestock	Wage/salar y	Farm Labour	Social grant	Remittance
Amount						

5.2 In the last 12 months, on what did you spend your cash income?

Item	Farm	Food	Funeral	Savin g	Ritual	Educatio n	Transport	Buildin g	Entertainment
Amount									

## 6. ACCESS TO SERVICES AND GOVERNMENT SUPPORT

6.1 In the last 12 months, have you received or benefited from the following;

Service/support	1-Yes 2-No	How often/Lon g	How satisfied are you with the service or support offered a) Satisfied b) Not satisfied	Would you wish to have it again a) Yes b) No	How important is to you 1-very important 2- Not very important
Extension					
Finance					
Training input use					
Record keeping					
Financial reporting					
Agro-processing					
Marketing					

## 7. GROUP MEMBERSHIP

7.1 Do you belong to any farmer group or association? 1. Yes [ ] 2) No [ ]

7.2 If yes to 7.1, provide type and name of group

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Thank you

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