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UNIVERSITY OF FORT HARE

FACULTY OF SCIENCE AND AGRICULTURE

DEPARTMENT OF AGRICULTURAL ECONOMICS AND EXTENSION

Trends in commercialisation of communal agriculture in the Eastern Cape Province

Degree of Master of Science in Agriculture (Agricultural Economics)

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January 2013

DECLARATION

I, Zoleka Ncoyini hereby declare that this thesis is my original work, and has not been submitted in partial or entirety for degree purposes to any other university. All the work that was written by other authors and used in the thesis is fully acknowledged.

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SIGNATURE:

DATE:

PLACE:



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DEDICATION

To my loving husband, Sixolise Manciya, beloved two daughters, Linathi and Luminathi Manciya and to my parents who have always given me moral support to study.



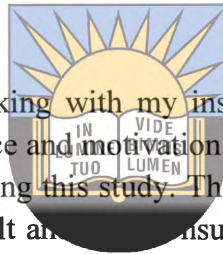
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I would like to thank GOD ALMIGHTY for opening up the way for me, you had it all planned. Thank you Lord for the wisdom, guidance and the power to pass through, you made it possible for me.

I am grateful for the privilege of working with my insightful, knowledgeable supervisor; Prof. Ajuruchukwu Obi. It was his advice and motivation throughout the process that enabled me to achieve my objective of completing this study. The preparation and writing up of this research proved to be extremely difficult and time-consuming. However, the task was made considerably easier by the capable and energetic supervision of Professor Ajuruchukwu Obi, who advised me from the initial stage until the final stage of this study. I am highly indebted to him for providing me with inspiration, encouragement and advice along the way. I am also grateful to Dr Portia Ndou and Dr David Afful, post-doctoral fellows assigned to Professor Obi’s group, who provided much-needed guidance during data collection, analysis and writing up.



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My husband, Sixolise Manciya, your faith in me pushed me into putting extra effort. Thank you for believing in me. I would also like to acknowledge the support of fellow colleagues and friends such as Nontembeko Mbusi, Douglas Kibirige, and Gidi Lungile. I would like to thank you for all the support that you provided.

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ABSTRACT

Smallholder irrigation projects were initiated in the former homelands with the aim of promoting food self-sufficiency and to contribute to rural development. Among others, the motive was to enable farmers to improve their productivity and thus shift the production from home consumption towards a market-oriented production. Unfortunately, the outcomes of the established smallholder irrigation project were not as good as expected. Although there have been some successes, the overall record of smallholder irrigation projects in achieving their intended objectives to the former homelands has been disappointing. The study intended to explore whether access to irrigation has influence on farmers choice of market participation and level of market participation. The study was conducted in Nkonkobe and Ngqushwa Local Municipalities of the Amathole District Municipality in central Eastern Cape Province. The areas under investigation are Ndlambe village which is part of Tyefu irrigation scheme and Women's Project in Melani village of Alice.. This was achieved through personal interviews in these two areas. Primary data were obtained through a structured questionnaire in both areas. These two villages were chosen because the study intended to compare the market participation between farmers who have access to irrigation and those that depend on rain-fed production. In order to test the factors that have a probability of influencing market participation choices among the sampled households, a binomial logistic regression model was used and a truncated regression model was used to test factors that influence quantity decisions of the households who were selling their produce.



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The Binomial regression analysis results show that the statistically significant variables at 5% level are access to markets and ability to sustain production. Alternatively, the truncated regression analysis results illustrate that statistically significant variables at 5% level is access to markets while membership on irrigation scheme is significant at 10% level. An improved market access would result to market participation as well as increased level of market participation. This implies that there will be an upward trend in commercialization of communal agriculture in rural areas. The results suggest that type of irrigation used does not have much impact on commercialisation of communal agriculture since it was found to be statistically significant at 10%. The study concludes that improved market access will significantly lead to high level of commercialisation.

Key words: Market participation; market oriented agriculture, smallholder farming, irrigation scheme, truncated regression model.



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LIST OF ABBREVIATIONS AND ACRONYMS

ACB	Agricultural Credit Board
ADP	Amathole district Municipality
ARDC	The Agriculture and Rural Development Corporation
AGRISETA	The Agricultural Sector Education and Training Authority
ANZDEC	Asian-New Zealand Development Consultants
BLR	Binomial Logistic Regression Model
CASP	Comprehensive Agricultural support program
DWAF	Department of Water Affairs and Forestry
ESRF	Economic and Social Research Foundation
FAO	Food and Agriculture Organization
GDP	Gross Domestic Product
HCI	Household Income Consumption Expenditure Index
HVC	High Value Crops
IDP	Integrated Development Plan
IFD	The International Fund for Agricultural Development
IMR	Inverse Mills Ratio
IPTRID	International Programme for Technology and Research in Irrigation and Drainage
KZN	Kwa-Zulu Natal
MAFISA	Micro-Agricultural Finance Initiative of South Africa
MEC	Member of the Executive Council
NGO	Non Government Organization
OLS	Ordinary least square
SIS	The smallholder irrigation sector
SPSS	The statistical Package for Social Scientists



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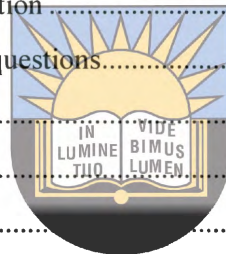
SSA	Sub-Saharan Africa
SSI	Smallholder system innovation
StatsSA	Statistics South Africa
TLC	Transitional Local Council
TFP	Total Factor productivity
TRC	Transitional Rural Council
UNIDO	United Nations Industrial Development Organization
WUAs	Water Users associations



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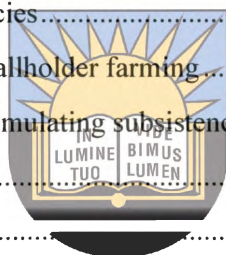
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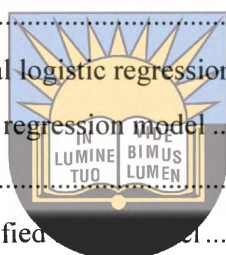
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CHAPTER 1

INTRODUCTION

1.1 Background

The recent economic statistics indicates that South Africa is a lower middle-income country (National Master.com, 2012). This statement provides evidence of what Perret (2001) indicated in the study conducted 11 years ago that South Africa is a lower middle-income country. Perret (2001) further mentioned that South Africa's agricultural productivity is very low compared to other countries in the same category. Although South Africa has a well-performing commercial sector, its agricultural sector accounts for less than 4% of Gross Domestic Product (GDP) and 14% of the country's labour force. The Agricultural Sector Education and Training Authority (AGRISETA) (2010) describes South Africa's agricultural sector as dualistic, featuring a modern commercial farming sector using hired farm workers alongside smallholder farmers, mostly found in the former homeland areas. The commercial sector comprises of well-resourced large, mainly white owned and operated farms. The sector contributes significantly to the value of agricultural production in the country. Mudhara (2010) describes the agricultural sector as a "R66 billion industry", which means that it may have contributed as much as 2.7% of the country's GDP in 2009. On the other hand, agriculture employs 4.75 million people, of whom 4 million are engaged in agriculture for subsistence purposes.



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Land under irrigation in South Africa is estimated to be 1.3 million hectares for both commercial and subsistence agriculture (Yokwe, 2005; Ntonto 2005), with only 0.1 million ha in the hands of smallholder irrigators (Tekana & Oladele, 2011). Perret and Touchain (2002) stated that about half of the country's available water is utilised by these schemes while they are contributing only 30% of total production. According to Yokwe (2005), the smallholder irrigation sector (SIS) alone accounts for about 4 to 5 percent of irrigated areas in South Africa. Perret and Touchain (2002) reveal that the estimation is that two thirds of South Africa's Small-scale irrigation schemes (SIS) are dedicated to food plots, the purpose of which is subsistence and that 200000 to 230000 rural black people are dependent at least partially for a livelihood on such schemes.

Perret (2001) reported that Eastern Cape is one of the poorest provinces in South Africa, with 70.7% of its 6.2 million inhabitants classified as poor. Eastern Cape also has the highest rate of unemployment. Bembridge (1984), as cited in Perret (2001), highlighted that Eastern Cape, particularly the former Transkei region, has been characterised by prominence of labour out-migration since the end of the 19th century. Straton (2012) provided evidence that the Eastern Cape unemployment rate is the second highest in the country at 28.3%. Perret (2002) further explained that one quarter of the total South African mining labour comes from the former Transkei, where 60% of the adult inhabitants (15 to 64 years old) are female. Lahiff (2002) also indicated that Eastern Cape is, by most indicators, the province with the highest incidence of poverty in South Africa: it has the lowest mean monthly household expenditure, and 48% of the population is classified as living in poverty. Lahiff (2002) also explained that poverty is more prevalent particularly in the former homeland areas where Africans (that is, indigenous black population) are located. This indicates that the great majority of the poor are located in the former Ciskei and Transkei, and poverty is particularly pronounced among black, rural and female-headed households.

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A study by Manona (2005) indicates that there is a shift in cultivation practices with declining use of arable plots in favour of home food gardens. Theft, long distance from homestead and higher production costs are the major reasons of field abandonment. This clearly connotes that smallholder farmers in the Eastern Cape do not consider farming as a business. Manona (2005) further provides evidence that a study conducted in Melane village, near Alice, confirmed a “virtual collapse of agriculture” which has resulted in the dependence of rural people on non-agricultural income, which includes wages, social pensions and remittances. In addition, the Member of the Executive Council (MEC) of Rural Development and Agrarian Reform in the Eastern Cape concluded that:

“Until the poorest of the poor farmers start producing not for the family alone, but are also able to market and sell their excess production, the contribution from agriculture to economic development will remain constant. Only through the development of this farming group will a visible impact be realised” (Department of Rural Development and Agrarian Reform, 2007: By Zoleka Capa).

Mudhara (2010) explains that the current reality of agriculture in the former homelands of South Africa is a depressing situation characterized by widespread abandonment of land due to increased urbanisation. This result in the smallholder agriculture not fulfilling the pivotal role it should be playing in rural areas and the country at large. Ntsondo (2005) stressed that smallholder irrigation schemes could play an important role in both rural and economic development since they can potentially provide food security; income and employment opportunities. Mudhara (2010) argued that the land reform programmes in South Africa disregard communal farmers and are largely premised on alternative models to the communal agriculture. Van Averbeke, Denison, and Mnkeni (2011) support the argument that commercial orientation of irrigated agriculture on smallholder schemes was mostly restricted to plots larger than 2ha. Nyandoro (2007) confirmed that peasant or small-scale farming has been considered an inadequate foundation for development. Previous studies indicate that due to the commitment of smallholder farmers to subsistence farming; they fail to sustain level of marketable surplus, thus impose risk to customer. Large scale farms, on the other hand, were relied upon due to the belief that they produce a more reliable flow of marketable surplus. Thus, commercial agriculture is the preferred model as it is adjudged to bring several benefits, chief among which is employment creation on the farm, national food security, accompanied with affordable food prices (Mudhara, 2000).



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Gebremedhin and Jaleta (2010) believed that commercial transformation of subsistence agriculture is an indispensable pathway towards economic growth and development for many agriculture dependent developing countries. They further explained that sustainable household food security and welfare also require commercial transformation of subsistence agriculture. In commercial agricultural production there is competition that leads farmers to realisation of comparative advantages, economies of scale and dynamic technological and organizational effects that arise due to exchange based interactions. Commercialization enhances the links between the input and output sides of agricultural markets. Okezie, Nwosu and Okezie (2008) further explained that commercialization of the agricultural system leads to greater market orientation of farm production, progressive substitution out of non-traded inputs in favour of purchased inputs, and gradual replacement of integrated farming system by specialized enterprises.

Riddell, Westlake and Burke (2006) highlighted that the introduction of irrigation most commonly improves the overall level of quality and leads to less variation in quality between

producers and between years and also extends the cropping season to allow multiple cropping, permit new commercial crops and varieties to be grown, thus providing wide opportunities for farmers to be part of the mainstream economy. The adequate water supply may lead households to shift from traditional self-sufficiency goals towards profit and income oriented decision making. As a result, farm output is accordingly more responsive to market trends (Chirwa & Matita, 2011).

1.2 Problem statement and study justification

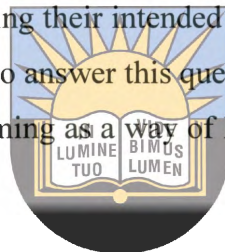
Past years of global economic reforms have forced South Africa to review its policies regarding food production and marketing. During the process of policy review, a need for improving the access of resource-poor farmers to land, water and institutional support systems as a way of combating poverty was recognised (Magingxa & Kamara, 2003). Mudhara (2010) indicated that the South African government has some support mechanisms in place to stimulate commercialization of subsistence agriculture in rural areas. These include: land reform and farmer settlement, production loans schemes for small farmers (Comprehensive Agricultural Support Program (CASAP) particularly for land reform beneficiaries), infrastructure grant for smallholder farmers and the tractor mechanisation scheme. AGRISETA (2010) stated that development of agriculture through commercialisation will allow participation of subsistence farmers in mainstream agriculture.

Agricultural development through commercialization strategy can promote household food security through expanded smallholder production. In addition, commercial agriculture can also be achieved through optimal use of agricultural land. However, commercialisation cannot be achieved with limited access to water for irrigation. The perception is that irrigation is the first step in promoting agricultural development in impoverished rural areas (Ntsonto, 2005). The reason is that successful smallholder irrigation may lead to increased productivity of food crops, improved incomes and nutrition, employment creation and food security. Successful smallholder irrigation also help smallholder farmers to overcome drought while also improve savings for the government (Tekana & Oladele, 2011). As a result, it is generally agreed that society at large stands to benefit when smallholder irrigation schemes are transformed from predominantly subsistence-oriented projects to schemes where production is primarily market-oriented (Van Averbeke & Mohamed, 2006).



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Omiti, McCullough, Otieno, Madelon, Nyanamba, and Murage (2006) revealed that efforts to promote small-scale farming have been made in the past but much more still needs to be done to make a positive difference in terms of ensuring integration to urbanized/globalized markets. The study by Machethe, Mollel, Ayisi, Mashatola, Anim and Vanasche (2004) support the argument that smallholder irrigation projects were initiated in the former homelands with the aim of promoting food self-sufficiency and to contribute to rural development. Among others, the motive was to enable farmers to improve their productivity and thus shift the production from home consumption towards a market-oriented production. Unfortunately, the outcomes of the established smallholder irrigation project were not as good as expected. Although there have been some successes, the overall record of smallholder irrigation projects in achieving their intended objectives to the former homelands has been disappointing. The study tried to answer this question; ‘what is holding smallholders back from moving from subsistence farming as a way of life, towards a more entrepreneurial attitude?’



Smallholder farmers in South Africa have been subjected to official neglect, despite numerous policies and programmes that proclaim the opposite (Hall & Aliber, 2010). The study is based on the premise that agricultural development is one of the major strategies that can be adopted to reduce poverty and contribute to local economic development through uplifting communal farmers in rural areas. Therefore, since revitalization of irrigation schemes is one of the options being considered as part of the larger rural development programme, it is important to examine the impact of developed irrigation schemes on the commercialisation of communal agriculture in the Eastern Cape Province.

1.3 Objectives of the study and research questions

a) Objectives of the study

The aim of this study is to explore the trends in commercialization of communal agriculture in rural areas with special reference to the former Ciskei homeland area of Eastern Cape Province. The study seeks to explore factors that influence or enhance market participation of smallholder farmers. A secondary aim is to explore the role of the rehabilitated irrigation

system in stimulating commercialization of subsistence agriculture in the former homeland of Ciskei.

The study has the following specific objectives to:

- describe the existing farming system practised by smallholder farmers
- understand the impact of small-scale irrigation scheme on commercialisation of communal agriculture in the former Ciskei of Eastern Cape.
- determine the aspirations and goals of farmers to expand irrigation crop production from subsistence farming towards market oriented production.
- explore the potential opportunities and challenges to commercialization of subsistence agriculture in the communal areas of the former Ciskei homeland.
- put forward recommendations

b) Research question and sub questions



The study aimed to reveal the factors that influence or enhance the transition of smallholder farmers from communal agriculture to commercial agriculture. The main research question is: Is market participation of smallholder farmer restricted? The study also seeks to address the following questions:

- What is the existing farming system employed by smallholders farmers in the specified study area?
- What role does the rehabilitated small-scale irrigation scheme have on commercialisation of smallholder farmers?
- What are the goals and aspiration of farmers to expand irrigation crop production from homestead gardens to irrigation plots and/or from one to more than one irrigation plot?
- What are the potential opportunities and challenges facing farmers to switch from subsistence communal agriculture to market oriented agriculture in the former Ciskei homeland?

1.4 Hypothesis

Main research question:

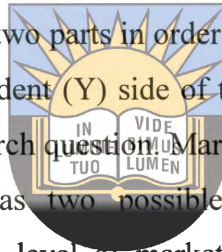
Is market participation of smallholder farmers restricted?

Hypothesis:

H0: market participation of smallholder farmers in Melani and Ndlambe villages is restricted. $\{\beta = 0\}$.

H1: market participation of smallholder farmers in Melani and Ndlambe villages is restricted. $\{\beta \neq 0\}$

The main research question is split into two parts in order to formulate the left and right hand side of an equation (model). The dependent (Y) side of the model / equation is reflected as “Market participation” in the main research question. Market participation will be obtained as a binary response variable, which has two possible outcomes; the farmer is either participating or not participating. The level of market participation in this case will be measured by sales index which is gross value of crop sales divide by gross value of crop production. The independent variables will be the factors that affect market participation. H0 is the null hypothesis thus $\beta = 0$, which means that if it is accepted that $\beta = 0$ it will mean that the predictor variable will have no influence on the dependent (Y) variable. If it is rejected, the alternative hypothesis (H1) is true; therefore, the predictor variable will have influence on the dependent (Y) variable, thus being a constraint.



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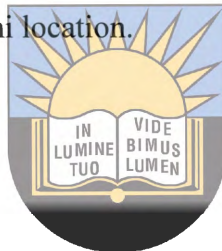
1.5 Assumptions

The study assumes that there is a transition of smallholder farmers from subsistence farming towards market oriented production in the former Ciskei of Eastern Cape. The study also assumes that the majority of communal farmers in the former Ciskei are willing to participate in the market oriented agriculture and perceive it as a good strategy of uplifting smallholder farmers through access to inputs and markets, access to large amounts of land, access to information, improved production and productivity, higher incomes and improved standards

of living. The study also assumes that the government is involved in stimulating communal farmers to transform their production from food crop production to cash crop production.

1.6 Delineation and limitations

The study investigated the impact of water use patterns in the trends of commercialization of communal agriculture in the former Ciskei of Eastern Cape Province. The study focused on the development of communal farmers in rural areas of the two local municipalities of Amathole District Municipality, namely Nkonkobe and Ngqushwa local municipalities. The limitation of the study is that it focuses only on homestead gardeners and smallholding irrigation farmers of Ndlambe and Melani location.



1.7 Definition of terms

According to Sokoni (2007), commercialization of smallholder production is a process which involves a transformation from production for household consumption to production for the market. In other words, commercialization refers to the trend toward increasing the proportion of agricultural production that is sold by farmers. The commercialization process is characterised by improved access to production factors (land, labour and capital) as well as improved local infrastructure (roads, communications) that connects farmers to the markets.

Communal agriculture is often the sector of developing economies that present the most development problems, such as lack of access to credit, piped water as well as small sizes of production loans. According to economic criterion, communal farmers are best described as those who consume the bulk of their production. In other words, communal farming is described as production for consumption, with the surplus sold to the market for cash income (Gilimane, 2006). It is also described as the case where all output is consumed by the household, and all labour is family labour.

Mendola (2005) defines commercial agriculture as the sector where all output is sold, and all labour is employed labour. Commercial agriculture is a progression from diversified farming,

when the farmer's intention is to produce goods for sale primarily for widespread consumption by others. It requires a sufficiently large amount of arable land and/or sufficiently advanced technology.

1.8 Outline of the study

The dissertation is divided into 5 chapters. Chapter 1 introduced the background, the problem statement, objectives, and the significance of the study. Chapter 2 reviewed the literature on the role of water utilization in commercialization of South Africa's communal agriculture. The impact of water utilization on transition from home gardens to fields plot specifically former Ciskei of Eastern Cape is reviewed. Other topics that are reviewed include: the effect of betterment planning, goals and aspiration of farmers the commercialization state in sub Saharan Africa and the concept of entrepreneurship and innovation. One of the purposes of this review is to investigate the progress made on commercialization of communal agriculture. The reviewed literature guides the selection, analysis and interpretation of the results. Chapter 3 discussed the methodological approaches and specific data collection techniques that were used. The chapter begins by describing the background of the study area. The description of the methodology is aligned with the specific objectives proposed for the study in chapter one. The nature of data collection was described in addition to the sampling procedure, data collection techniques and data analysis methods. The chapter finally discussed the limitation of the study. Chapter 4 presented research findings in respect to the demographic and socio-economic settings. This was followed by a presentation of the findings in respect of the agricultural development, particularly, at entrepreneurship and innovation, farming systems, resource use and commercialization of communal farmers, as well as challenges, and opportunities identified. In this respect, the assessment of market access by farmers was carried out to evaluate the trends of commercialisation of communal agriculture. Furthermore, statistical tests were carried out also to determine the changes in respect to commercialisation of communal agriculture in rural areas. Chapter 5 summarised the research findings and offer recommendations based on these results.



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Chapter begins by describing

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter presents an overview of literature on the role of water utilisation on commercialization of communal agriculture in rural areas. Specifically, it points out the background on the state of communal (small-scale) agriculture in Sub-Saharan Africa. It also focuses on the concept of entrepreneurship and innovation with its conceptual origins in communal agriculture. Overview of commercialisation processes in agri-food system is also highlighted. It further points out the irrigation-led small-scale commercialisation which defines small-scale irrigation in other developing countries as well as advantages of irrigated production. Conceptual framework which describes the smallholder's farmers' choice of market participation is also presented in this chapter. It further discusses goals and aspirations of small-scale farmers. It is very important to know the current state of commercialization of SSA hence it is highlighted in this chapter. This chapter also explains the number of factors that affect the commercialization process of agriculture, which include access to necessary agricultural production resources and basic support services. Effect of betterment planning on small-scale is revealed. Furthermore, determinants and impact of commercialization of communal agriculture are revealed. Finally, commercialization trends in the Eastern Cape Province and the causes of its state are discussed.



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2.2 The smallholder agriculture in Sub-Saharan Africa

Gilimane (2006) describes smallholder agriculture as the sector of developing economies that present the most difficult development problems. On the other hand, Ellis (1988) as cited by Machingura (2007) described smallholder farmers as farmers who have access to land and practise subsistence farming as one of their livelihood strategies. These farmers produce mainly for home consumption and for sale using family labour for production. Terms that are used to describe these farmers include smallholder farmers, resource-poor farmers, peasant farmers, food-deficit farmers, land-reform beneficiaries and emerging farmers (Fanadzo, Chiduzo & Mnkeni, 2010). In south Africa, land sizes, purpose of production (subsistence or

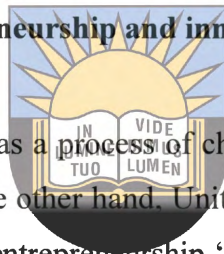
commercial) and level of incomes (rich or poor) as well as skin pigment are the major criteria used to classify farmers (Fanadzo, 2012).

Smallholder farmers have been considered less innovative because they focused more on subsistence production. Among others, the following factors have caused of smallholder farmers to remain underdeveloped: tradition fatalism, low aspiration levels and lack of differed satisfaction. Louw, Ndanga, Chikazunga and Jagwe (2008) supported the argument that smallholder farmers have been excluded from mainstream markets, particularly in South Africa, since the apartheid regime. This shows that the exclusion of smallholder farmers is not new but dates back to the colonial period.

2.3 The conceptual origins of entrepreneurship and innovation in communal agriculture

Waziri (2012) defines entrepreneurship as a process of change where innovation is the most vital function of the entrepreneur. On the other hand, United Nations Industrial Development Organization (UNIDO) (1999) defined entrepreneurship ‘as the process of using initiative to transform business concept to new venture, diversify existing venture or enterprise to high growing venture potentials’. These definitions clarify that entrepreneurship is a process of transformation where innovation, development, recognition, seizing opportunities are involved to convert opportunities to marketable ideas and value while bearing the risk of competition. On the other hand, Shola (2010) explained that basically, innovation involves changes that lead to improvement of quality and quantity of products as well as techniques used. Innovation allows the entrepreneur to introduce new production techniques, new products, improve the existing products, open up new markets, explore new sources of raw materials and design new techniques of management.

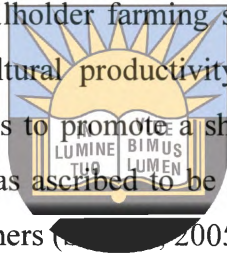
Provost (2011) stated that African countries are facing a food production challenge. Even with great physical and climatic potentials for food production, African countries consider food imports as a major source of food. Grimm and Richter (2008) stated that Sub-Saharan Africa (SSA) is one of the regions where food insecurity, income inequality and poverty are irrepressible. As a result, impoverished and hungry households in rural areas rely mainly on agricultural production for both consumption and sales. The dependency of Africa on food imports has been increasing and has had negative results on poverty eradication because



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African countries cannot afford it (Grimm & Richter, 2008). On the other hand, Sturdy (2008) emphasized that world poverty eradication needs farmers with an entrepreneurial spirit where farmers will be able to develop and implement sustainable techniques for producing and distributing adequate food supplies worldwide. However, Abdel-Dayem, Dinar and Kane (2006) argued that insufficient irrigation system is a limiting factor for farmers to diversify production.

Thus, apart from the land reform programme to develop agriculture, the South African government in particular, initiated a revitalization of irrigation schemes programme soon after the 1994 elections with the aim of developing smallholder agricultural production (Riddell *et al.*, 2006). These smallholder irrigation systems were promoted because they are less expensive and well-suited for smallholder farming system. This serves as one of the government's responses to low agricultural productivity and the absence of commercial agriculture in the homelands. The aim is to promote a shift of farmers towards commercial farming and to bring change to what was ascribed to be a perceived lack of entrepreneurial and managerial ability among black farmers (Riddell *et al.*, 2005). The government and agencies in the water sector aim to manage water resources appropriately in the country in order to ensure that development is not constrained by lack of adequate water supply (Peter, 2011).



Kimsum, Socheth and Santos (2011) state that recent econometric study by Dillon (2011) illustrates a robust story that the 'presence of irrigation facilities shifts cropping patterns in favour of high value cash crops, increase crop production, farm equipments and durable assets, and has a positive impact on socioeconomic status such as income, nutrition and health, that is reduced poverty and inequality'. International Programme for Technology and Research in Irrigation and Drainage (IPTRID) (1999) stated that the presence of irrigation leads to a high performance of the farm through improved productivity and value through intensification of cropping and improvement in crop choice. Riddell *et al.* (2006) highlighted that the introduction of irrigation generally improves the overall level of farm productivity both in terms of quality and quantity. It leads to less variation in product quality between producers and between years and also extends the cropping season to allow multiple cropping, permit new commercial crops and varieties to be grown, thus providing wide opportunities for farmers to be part of the mainstream economy.

McElwee (2005) supported the argument that farmers are becoming more entrepreneurial and developing new skills and functional capabilities in order to be competitive. In one of the countries of his study, Poland, entrepreneurship is a relatively recent phenomenon. Von Braun (1995) also believes entrepreneurship in farmers becomes common as economies grow. Von Braun (1995) further explains that this may be as a result of rapid technological change in agricultural production, improved rural infrastructure, and diversification in food demand patterns.

Furthermore, farmers' and nations' option for survival and for sustainability have become increasingly important to ensure success in changing their perspective economic environment. This is due to changes in socio-economic, political, environmental and cultural dimensions in some African countries. It is also worth noting that the emergence of the free market economies globally has resulted in the development of a new spirit of enterprise and the increased individual need for responsibility for running their own businesses (Lukwaba, 2011).



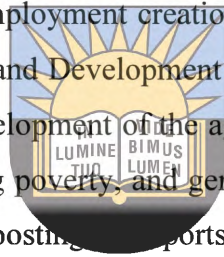
2.4 Overview of commercialization processes in agri-food systems

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Generally, agriculture has a crucial role to play in advancing rural development and alleviating poverty. However, communal farmers are still in poverty. Moloji (2008) stated that for communal farmers to be poverty-free and experience sustainable economic growth through increased employment, a suitable income generation agricultural environment has to be created in underprivileged rural areas. This implies that the communal sector needs to be encouraged and properly assisted to stay in production and make its contribution to the welfare of the country as a whole. Therefore, through commercialisation of emerging farmers and alleviation of socioeconomic constraints, previously disadvantaged farmers can be part of the economic base of rural economies (Moloji, 2008).

Omiti *et al.* (2006) elucidated that through the process of agricultural commercialization, communal farmers' shift from communal food production to cultivation of cash crops and rearing of livestock for commercial purposes. The intensification of production processes as well as the introduction of new technology and mechanization also takes place during agricultural commercialization. Modernization and mechanization can lead to improved farm

productivity and income while on the other hand, reduces the need for manual labour and, therefore, reduces employment and income options in rural communities. Gebremedhin and Jaleta (2010) stated that commercialization of smallholder agriculture can be adopted as a strategy for economic transformation. The agricultural extension services, credit and input supply are expanding significantly to support commercial transformation, although the dominant player in these services still remains to be the public sector. A previous study by Gabre-medhin (2009) showed that the expansion of the agricultural services had a significant impact on the intensity of input use, agricultural productivity and market participation of Ethiopian smallholders. In fact, growth of agriculture is expected to be perhaps the single most important factor in poverty reduction, for the simple reason that most of the poor depend on agriculture for their livelihood. Commercial agricultural development is expected to benefit the poor primarily through employment creation and the creation of opportunities in the non-farm sector (Asian-New Zealand Development Consultants (ANZDEC), 2003). In summary Taffese (2003) stated that development of the agricultural sector in Africa is seen as central to combating hunger, reducing poverty, and generating economic growth (through the reduction of food imports and the boosting of exports). However for commercialization, to be achieved substantial land and water development will have to take place.



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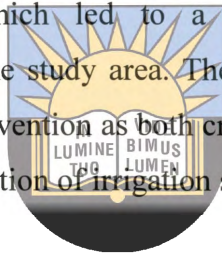
2.5 Irrigation-led small-scale commercialization

Rain-fed agricultural production in sub-Saharan Africa is still unpredictable and only the inter-seasonal and interannual management of water offers a means of buffering regional production shortfalls. Beyond this, concentration of inputs around irrigated production offers a means to service specific export-market demand (Riddell *et al.*, 2006). The significant contribution of irrigation water in many productive and livelihood activities prove that irrigation is a vital resource in agriculture. Thus, with the common belief on the important role of irrigation in agricultural growth, many developing Asian countries have promoted irrigation development over the last five decades to achieve such broad objectives as economic growth, rural and agricultural development, employment and wages and overall socio-economic welfare (Hanji, 2006).

According to Food and Agriculture Organization (FAO) (2009), irrigation brings a range of potential changes in agricultural production. Previous research by Lipton and Litchfield (2003) declared that first direct impact of irrigation is on output levels. Irrigation improves

total farm output which results in increased farm incomes. Increased output levels may arise due at least to three reasons. Firstly irrigation improves yields through reduced crop loss due to erratic, unreliable or insufficient rainwater supply. Secondly, irrigation allows for the possibility of multiple-cropping, and so an increase in annual output. Thirdly, irrigation allows a greater area of land to be used for crops in areas where rain-fed production is impossible or marginal. Hence, irrigation is likely to boost output and income levels.

Higher yields, higher cropping intensity and all year round farm production lead to increased market-oriented production, implying a shift in supply (marketable surplus production) and perhaps food security (Hagos, Makombe, Namara, and Awulachew, 2008). The recent study by Gebreselassie and Ludi (2010) showed that the introduction of irrigation schemes resulted in changes in cropping patterns which led to a significant improvement in the commercialization of smallholders in the study area. The study showed that all participant farmers responded positively to the intervention as both cropped area and the number of cash crop growers increased after the introduction of irrigation scheme.



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2.5.1 Small-scale irrigation in developing countries

Van Averbek and Mohamed (2006) defined smallholder irrigation as multi-farmer irrigation projects larger than 5ha in size that were either established in the former homelands or in resource-poor areas by black people or agencies assisting their development. These smallholder irrigation schemes consist of a number of smallholder irrigators who unite to form a multi-farmer project. Tshuma (2009) indicated that these schemes were basically run and managed on behalf of the small farmers by the government through its relevant organs. In the case of Kenya, smallholder community irrigation schemes are being developed in different land tenure systems, and vary in terms of irrigated area from 20 to 200 ha. In most cases, the development takes place on private land where farmers hold individual titles to the land. These irrigation schemes are owned, operated and managed by the farmers through their respective water users associations (WUAs) (Grimm & Richter, 2006). De Lange (1994) categorized the smallholder irrigators that make up the smallholder irrigation schemes in South Africa into farmers on irrigation schemes; vegetable gardeners (served by communal water supply infrastructures); and independent farmers each with a private water supply.

Small-scale irrigation schemes are being promoted because of the associated benefits listed below: lower investment costs, ease in maintenance, end-users being able to have more control of the water they need, the possibility of remote areas (where there are poorer farmers) gaining access to controlled water, small-scale irrigation require very little in terms of enterprise and management capability. Small-scale irrigation (those schemes under the direct management of smallholders) also enables farmers (those outside of the major irrigation perimeters and who would otherwise have to depend on irregular and variable rainfall) to increase crop intensities through double cropping, through supplementary watering during drought, as well as enable crop/forage growth in dry areas (crop expansion) (Taffese,2003).

2.5.2 Advantages of irrigated production



According to FAO (2009) introduction of irrigation brings various potential changes in agricultural production. Previous studies by IPTRID (1999) clarified that irrigation can increase output and value through intensification of cropping and innovation in crop choice. It can also extend the cropping season to allow multiple cropping, improve the quality of produce and permit new commercial crops and varieties to be grown.

However, Riddell, Westlake and Burke (2006) emphasised that the impact of a localized increase in production from, for example, a new irrigation scheme depends critically on the structure of the market into which the commodity sells and the impact that the production has on the structure of the market. On the other hand, the study by Kimsun, Hem and Paulo (2011) argues that the seasonal marginal return of having irrigation infrastructure still remains unclear. Farmers are not sure whether irrigation infrastructure in Cambodia leads to improvements in the livelihoods of the poor, looking in particular at the accumulation of farm assets as an indicator of this.

Riddell *et al.* (2006) supported the argument that as irrigation is introduced, its first impact is to increase supply into this market and to reduce local prices. This may not benefit only South Africa but also other countries because as production expands prices may fall locally due to surplus resulting in a point where the commodity can be exported profitably from the

locality into another domestic market, thereby in effect integrating the two markets into a single new market.

2.5.2.1 Spatial impact

Riddell *et al.* (2006) highlighted that irrigation affects the spatial distribution of agricultural production. It allows the growing of crops on land that was unable to sustain agriculture under rain-fed conditions; the more intensive growing of existing crops; and the growing of alternative crops. For example, in South Africa and other sub-Saharan Africa countries, irrigation has been utilized to raise the productivity of existing crop production, most notably the production of maize and vegetables.



As it has been noted that irrigation normally leads to substantially higher yields, it also has the effect of concentrating production spatially. The tendency for irrigation to lead to concentrated production applies to all irrigation regardless of the prior use of the land. The concentration of production raises the efficiency of marketing by allowing the exploitation of economies of scale, especially in transport. Concentrated production also allows larger and more efficient processing units and reduces the distances over which the raw commodity is transported to a processing unit (Riddell *et al.*, 2006). However, the benefits that stem from irrigation differ between commodities depending on the value-to-weight ratio of the raw commodity, its perishability, the extent to which it is damaged during transport, and weight loss during processing.

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2.5.2.2 Temporal impact

Irrigation has the major advantage that it reduces dependence on seasonal weather patterns. This, coupled with control of the input of water, allows shortened growing cycles and crops to be established and raised during seasons with little rainfall. The impact of this on output depends principally on whether the crop is perennial or annual. In general, there is a greater possibility of growing multiple crops at low latitudes where there is no distinct winter season and where there is adequate sunshine and warmth for rapid vegetative growth throughout the year. The impact on processing and marketing of the introduction of irrigated double

cropping depends on the storage properties of the unprocessed crop and on whether or not the same crop is planted during the second season (Riddell *et al.*, 2006).

2.5.2.2.1 Impact on quality

A switch from rain-fed to irrigated production affects the quality characteristics of the commodity produced, including size, taste, smell, visual appearance, milling characteristics, and cooking properties. It also affects the extent to which these characteristics vary within a single harvested crop and between years. In so far as irrigation leads to healthier plants, the general size and quality of the produce is likely to be higher (Riddell *et al.*, 2006).

Riddell *et al.* (2006) further stated that it is however possible that rapid growth may diminish the intensity of flavour and smell, reducing market value. The introduction of irrigation most commonly improves the overall level of quality and leads to less variation in quality between producers and between years. Reduced quality variation between producers serves to increase the efficiency of processing, especially where machinery is set for a specific standard of raw material, as is the case for most agricultural processing, particularly that involving milling. Reduced quality variation between years leads to two marketing benefits. First, it allows a set of irrigated farms or an irrigated estate to develop a reputation for a particular quality of produce that attracts regular customers prepared to pay a premium price for dependable quality. Secondly, it assists producers to predict the quality of their crop. This helps them to sell forward with confidence and to lock into an assured producer price prior to harvest.



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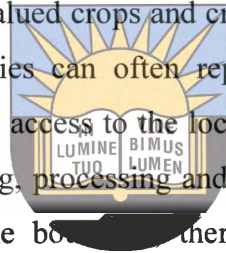
2.5.2.2.2. Impact on the stability and predictability of production

Income stability is particularly important for smallholder producing households. This is because they typically lack the capacity to save and normally do not have access to credit except informal credit at very high interest rates. This means that they are unable to moderate the impact of income instability on household expenditure. Consequently, they face severe hardship when income falls. The introduction of irrigation not only increases the level of crop output but also increases the stability of output from year to year. This tends to have a stabilizing impact on producer incomes, especially for internationally tradable commodities

whose domestic prices are a function of international prices. For low-value perishable commodities, for which markets clear domestically, quantity and price movements tend to be offsetting (Riddell *et al.*, 2006).

2.5.2.2.3 Other social impacts

First, there is the income stability that better predictability brings as does the ability to diversify and thereby hedge against both market and climate shocks. This helps with household or group financial planning, and it also makes credit more manageable. It can also make credit more accessible, thereby facilitating further increases in production. Diversification also means that higher valued crops and crops with significant seasonal niche markets and/or added-value opportunities can often replace former subsistence systems, thereby allowing poor households better access to the local and national economies. Added-value opportunities often include grading, processing and packaging, many of which can be carried out within the farm or scheme boundaries thereby raising incomes significantly (Riddell *et al.*, 2006).



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2.6 Conceptual framework: smallholder farmers' choice of market participation

A conceptual framework was developed to understand and explain the factors affecting smallholder farmer's objective of market participation. By including certain factors under the government policies, infrastructure development, production factors, socio-economic factors and external factors, the model tries to separate and analyze the determining factors from the enabling or constraining factors that affect smallholder farmers marketing performance. The wider and determinate government policies encapsulate the effect of these factors which includes markets, institutions, cultural, infrastructural development as well as new technology (Figure 1).

Smallholder farmer's choice is represented at the centre of the framework, implying that all the factors have an impact on the smallholder farmers' decision of market participation. Government policies are shown to have impact both directly and indirectly towards smallholder farmer's choice of market participation. Firstly, government policies are intervening indirectly to enhance socio-economic factors through improved market access or

institutions in favour of smallholder farmers. Secondly, government policies indirectly affect smallholder farmer's choice of market participation through improvement of infrastructural development which would lead to new technologies. Production factors (natural, human, physical, financial and social capital) also have direct impact on the smallholder farmers' choice of market participation. Some smallholder farmers are risk averters while others are risk takers; therefore the implication is that external factors (risk and uncertainties) have effect on farmers' choice of market participation. The option outcomes represent that with the positive impact of mentioned factors smallholder farmers would prefer to invest in farming, thus improve land productivity while with the negative impact smallholder farmers would prefer not to invest in farming, thus lead to abandonment of land.

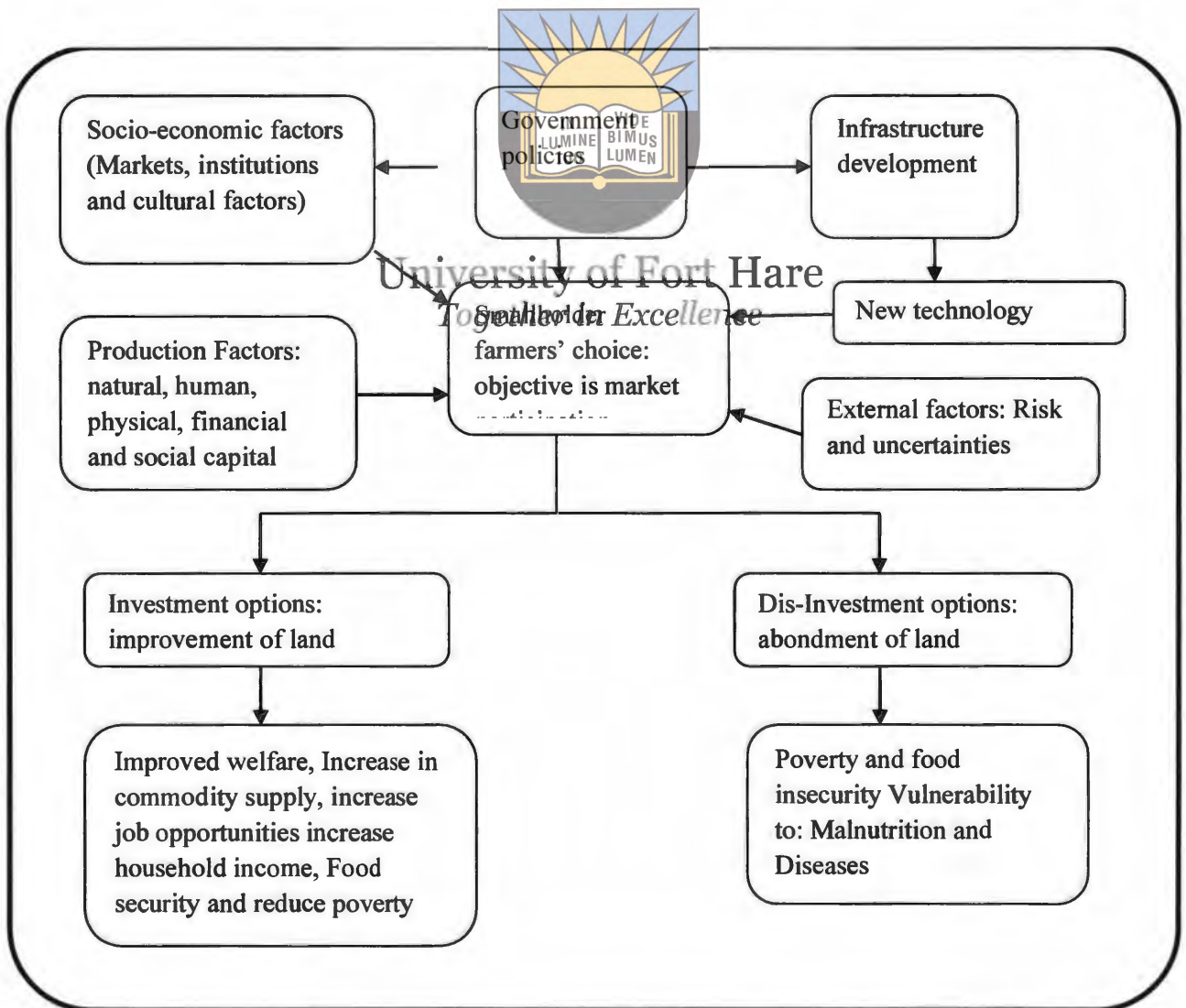


Figure 2.1: Farmers choice in market participation

Source: Adopted from Shiferaw, 2006

Shiferaw (2006) indicated that socioeconomic factors and availability of technology greatly influence the investment decisions or the development pathway that smallholder farmers undertake. When socioeconomic conditions are conducive and more profitable technologies are available, farm households may undertake productivity enhancing investments. Improved policies (e.g., secure property rights, credit, and insurance), enhanced markets access and institutional arrangements (e.g., credit delivery and extension systems) can create incentives for investing in options that expand short-term and future production and consumption possibilities. Such resource improving and productivity enhancing investments provide opportunities for the betterment of the livelihood of the poor.

On the contrary, unfavourable socioeconomic environment and absence of more profitable technologies result in lack of economic incentives for smallholder farmers to undertake resource improving and more sustainable investments. This leads to some household members to quit farming rather than move from subsistence agriculture to commercialized agriculture (Boughton, Mather, Barrett, Benn, & Mulugetta, Tschirley & Cunguara, 2007). This therefore clearly indicates that these highly constraining conditions which include lack of technological options and adverse biophysical, policy, and institutional environments may influence smallholder farmers to follow a more exploitative and unsustainable pathway of development. The development pathway followed by the farmer may lead to worsening conditions of the poor (Shiferaw, 2006).

2.7 Goals and aspiration

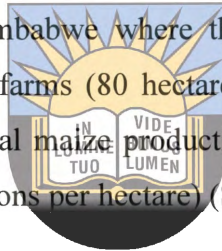
Even though small scale farmers are involved in production, many of them are still in poverty and unable to satisfy their needs for survival. Poor decision making may be the cause of the situation. Many smallholder farmers are still unable to tackle the challenges they come across on daily basis. Obi (2012) indicated that human dimension is very important in economic production because it assist farmers to plan properly from the start.

According to Obi (2012), needs are articulated through their production goals while aspiration defines the plans to be considered by farmers in order to achieve those needs. The needs and aspiration of the farmers vary between individual farmers. The farmers may choose

not to farm, to produce for home consumption, to produce for marketing or the combination of both marketing and consumption. On the other hand farmers' aspirations ranged from an unwillingness to farm, an unwillingness to increase production, and an eagerness to increase production. Some may have major immediate needs/aspirations while others may have major long-term needs/aspirations (Masiteng, van der Westhuizen & Matli, 2003)

2.8 Commercialization state in SSA

In most of Sub-Saharan Africa, over 96 percent of farmers are smallholder, farming less than 5 ha, usually with over two thirds having less than one hectare. Small-scale farms account for over 90 percent of agricultural production. Even in the mid- and high-altitude savannah woodlands of Kenya, Zambia, and Zimbabwe where the very visible white farmers are located, conspicuous large-scale maize farms (80 hectares or more), yielding 5-6 tons per hectare account for less than half of total maize production, and 99 percent of farmers are small scale, producing much lower (1.5 tons per hectare) (Spencer, 2001).



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However, with growing economies, subsistence farmers are shifting out of subsistence food crop production (monoculture system) to a diversified market-oriented production system. Nevertheless, the process is sluggish in Sub-Saharan Africa (Delgado, 1995; von Braun, 1995). Okezie, Sulaiman and Nwosu (2012) highlighted that “The countries of East Asia are at the high end of the agricultural commercialization pathway, while Southeast Asia and parts of Latin America are rapidly moving towards commercialization. The countries of South Asia and much of Sub-Saharan Africa are at the lower end of the commercialization pathway. While the speed of commercialization differs substantially across continents and countries, they are all moving in the same direction (This is because Sub-Saharan Africa agriculture depends mostly on rainfall for its productivity). Only 4% of arable land in the SSA region is irrigated compared to 35% in Asia and 15% in Latin America. Some efforts have been made by governments in respect to large scale irrigation schemes that require high levels of maintenance. Nevertheless, some of the initiatives undertaken have not delivered the expected results. Therefore, there is ample scope for increased irrigation in many parts of SSA, particularly for small-scale irrigation and water harvesting (Mcintyre, Herren, Hakhungu & Watson, 2009).

2.9 Other factors affecting the commercialization process in agriculture

Sebopetji and Belete (2009) argued that South Africa has a dual agricultural economy, with both well-developed commercial farming and communal farming in the remote rural areas. The majority of these communal farmers are not part of the mainstream agriculture and practice communal agriculture in the overcrowded semi-arid areas in the former homelands. Communal farming is characterised by low production, poor access to land, poor access to inputs, infrastructure, and information and most importantly access to credit for production requisites. Thus, there are a number of factors that affect the commercialization process of agriculture. Some of these factors lead to the increase in commercialisation of agriculture. These factors include availability of factor endowments, economic growth, urbanization and the withdrawal of labour from the agricultural sector. The effect of each factor on commercialization is explained below.



2.9.1 Adequate land

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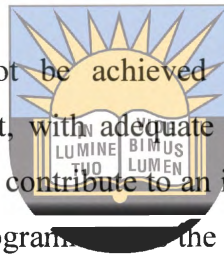
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According to Moloji (2008), access to land for production is an essential requirement for the poor to enjoy the benefits of agricultural growth. However, this cannot be achieved without support services provided to the farmers. This implies that access to land without support services, however, does not increase productivity. One of the problems facing emerging farmers is that the land for production is very small. Effective participation into commercial agriculture by emerging farmers cannot only be attained through massive transfers of land but will also require the implementation of strategies (i.e., support services) that could render the acquired land to be more productive and achieve high income. This shows that the availability of land has a positive contribution towards the productivity of emerging farmers. The increase in production appears to be positively correlated with an increase in the total area planted and not necessarily with an increase in productivity per unit area.

Previous studies by Lerman (2004) show that farm size has a strong positive impact on the degree of commercialization and on family incomes. It has been observed that farms are enlarged through land market transactions, which include buying and selling and, no less

importantly, leasing of land. It is land markets that enable land to flow from passive to active owners (e.g., from pensioners to farmers) or from less efficient to more efficient producers, thus increasing the overall productivity of this resource and improving farm efficiency. Though important, land is only one component of the operating environment that encourages commercialization. Given land, farmers should be able to produce, which requires channels for the delivery of knowledge, inputs, and machinery to the farms. Once the harvest is in, farmers should be able to sell it, which requires access to marketing channels (Lerman, & Sadik, 2009).

2.9.2 Access to support services



Smallholder agricultural growth cannot be achieved without farmer support services. International experience has shown that, with adequate access to farmer support services, smallholder agriculture can significantly contribute to an increase in agricultural growth. The main objective of the farmer support program is the promotion of structural change that is, a shift from communal agricultural production towards commercialisation of agriculture through the provision of support services to emerging farmers in South Africa. Lack of support services put the emerging farmers at a disadvantaged position to compete in the market, even if there are growth opportunities available in the market (Moloi, 2008).

Improvement of market access for disadvantaged smallholder farmers need adequate farmer support services. Among others these services involves a range of aspects, from ensuring that smallholder farmers produce products of the right quality acceptable to the market, to physical functions such as provision of improved infrastructure and up-to date relevant information. Therefore, farmers needs to be supported through the provision of marketing infrastructure (depots, auction pens, telecommunications infrastructure, etc.); information (on prices, markets, buyers, grades, etc.); extension (technical production issues, quality requirements, financial and market knowledge) and research (on a wide range of issues) (Senyolo, 2007).

2.9.3 Access to credit

Credit is an important instrument for improving the welfare of the poor directly through agricultural investment that reduces their vulnerability to short-term income. It also enhances productive capacity of the poor through financing investment in their human and physical capital. Access to credit is regarded as one of the key elements in raising agricultural productivity from communal level to commercial level (Sebopetji & Belete, 2009).

Moloi (2008) stated that access to credit has long been regarded as one of the key elements in improving agricultural productivity. One of the problems that small scale farmers are faced with is high interest rate. ANZDEC (2003) further explained that excessive emphasis is often given to interest rates as explanatory factors for the limited credit available to producers, traders and processors. In fact, even at high interest rates, smallholder farmers have a demand for credit. Apart from high interest rates, it is the presence of poorly understood and sometimes complex procedures to access credit, lack of knowledge of proper procedures and the absence of adequate collateral that prevent smallholder farmers from getting additional credit. On the one hand, cooperation among banks and financial institutions to a large extent ensures that market forces determine interest rates. On the other hand, the risk associated with lack of collateral presents a problem in the credit market that cannot be easily solved unless adequate insurance markets are established. The problem of lack of collateral is aggravated by the perception that commercial and high-value crop (HVC) production and prices are highly variable.

Under apartheid, access to credit was mediated through parastatal structures that enabled farmers to borrow money from the government at interest rates that were lower than market rates. These primarily involved the Land Bank, the Agricultural Credit Board (ACB) and the co-operatives. The government has tried to improve access to credit by retaining or creating new institutions to provide credit and by encouraging the private sector to extend loans to resource-poor or black farmers. The Land Bank was supposed to have played an important role in providing finance. The Land and Agricultural Development Bank Act 15 of 2002 changed the status and role of the bank, and since it subsequently had to raise its own funds on the money market, it could no longer subsidise interest rates. Contrary to the Act and the bank's 'self-financing' status, the bank remains afloat only because of large central

government grants, including a recent R4.5 billion bailout. While this led to the bank's fortunes improving, it did not have the same effect on farmers, many of whom were forced to depend on loans they were battling to pay off. Overall, government financial support to emerging farmers for finance has been very poor (Greenberg, 2010).

2.9.4 Market expansion

Louw *et al.* (2008) emphasised that food markets are constantly evolving, driven not only by changing consumer preferences but also by technology, food supply chain linkages, and prevailing policies and business environments. The consumer is the principal driving force in the global food market. Income growth, lifestyle changes brought about by urbanisation, demography, and changing family structures have resulted in diet changes among consumers worldwide. South Africa, in particular is a mature market, but still expanding to cope with the needs of an emerging and growing middle class. Louw *et al.* (2008) further stated that supermarkets are growing fast and replacing traditional markets that served as outlets for farmers' food crops and livestock products. This is because supermarkets are increasingly looking for supplier channels that allow them to maintain quality standards, traceability of products to their origin, steady supply of expected volumes all year round, and consistent delivery time. This has necessitated changes in their procurement systems, from decentralised and local procurement to centralised and regionalised systems. The transformation of the food marketing process presents both challenges and opportunities for smallholder farmers, especially in developing countries.

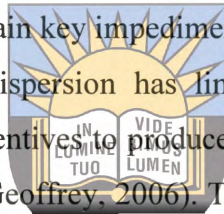
Louw *et al.* (2008) further explained that the challenges facing primary producers and their economic organisations in negotiating market access are constrained by globalisation, market liberalisation and modernisation. Thus, these challenges include technological, organisational and financial demands placed on the smallholder producer. The direct procurement system that has been adopted by modern markets increases the risk of smallholder farmers' exclusion from modern agro-food markets. The exclusion of smallholder farmers from mainstream food markets in Southern Africa is nothing new; it dates back to the days of colonialism, when they were subjected to a double-barrelled exclusion. They were excluded, first, as a result of the colonial legacy, and second, because of the poor performance of their production systems, which were characterised by high production and transaction costs, resulting in poor quality.



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2.9.5 Market liberalization

The new economic environment has opened a window of opportunity for farmers to harness market opportunities, diversify into tradable products and reduce dependence on communal farming. The removal of market barriers increased competition and allowed farmers to choose the buyers of their outputs and suppliers of key inputs. Despite these positive developments, markets have not been able to spur commercialization of smallholder agriculture that could provide incentives for increased production and investments for managing production risks. Hence, smallholder market participation and marketed surplus remain very limited. High transaction costs and the inability of smallholder farmers to consistently supply quality products remain key impediments to the realization of the benefits of liberalization, while geographical dispersion has limited market development. These factors have deprived farmers of the incentives to produce high value differentiated products with desirable traits (Gideon, Bekele & Geoffrey, 2006). This means that even though market liberalization has opened opportunities for smallholder farmers to diversify production and better target existing and emerging markets the pervasive rural market imperfections impede farmer responses to economic reforms and limit their ability to exploit market opportunities.



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Pingali and Rosegrant (1995) stated that liberalization of domestic markets, through removal of quantitative restrictions on trade and opening up of economies to internal trade opportunities is often a key step in starting or accelerating the process of commercialization. However, the opening of domestic markets also exposes producers to increased risk due to the greater volatility of world prices. Pingali and Rosegrant (1995) further indicated that general economic liberalization provides opportunities for diversification and commercialization, but also places a premium on flexible farmer response in the allocation of water, land and other resources in response to changing prices, comparative advantage, and economic opportunities. If rights to the basic resources such as land and water are poorly secured and enforced, these resources can remain locked into inefficient uses. Some of the worst apparent failures of commercialization cited in the literature, such as evictions of farmer-tenants, can be traced mainly to poorly defined land rights, rather than to the process of commercialization itself (von Braun, 1995).

Existing land tenure problems are exacerbated when net returns to land increase substantially due to commercialization, increasing the incentives to evict tenants. Secure land rights significantly improve the prospects for commercialization. Efficient land markets and secure property rights are critical for efficiency and agricultural growth. Secure rights to land create the incentives farmers need to invest in land improvements that conserve and increase the long-term productivity growth which can be induced by the start of commercialization (von Braun, 1995).

2.9.6 Urbanization

Urban expansion inevitably covers some agricultural land while changes in land values and land markets around cities often result in land left idle as the owners anticipate the gains they will make from selling it or using it for non-agricultural purposes. In most urban areas in low- and middle-income nations, the absence of any land-use plan or strategic planning framework to guide land-use changes means that urban areas expand haphazardly. This expansion is determined by where different households, enterprises and public sector activities locate and build, legally or illegally. In most instances, there is little effective control over land-use conversions from agriculture to non-agricultural uses (Satterthwaite, Mcgranahan, & Tacoli, 2010).



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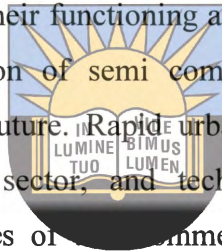
2.9.7 Decreasing of farming population

An increase in rural-urban migration results in a decrease in farming population as people leave farming for industrial jobs in cities. Internal rural to urban migration means that people move from rural areas to urban areas. In this process, the number of people living in cities increases compared with the number of people living in rural areas. Thus, urbanization brings major changes in demand for agricultural products both from increases in urban populations and from changes in their diets and demands. This means that one feature of urbanisation is the development of informal food supply systems. As in many other developing countries, urbanisation drives the emergence and spread of supermarkets, with more people being compelled to purchase food rather than producing it themselves (Louw *et al.*, 2008).

2.9.8 Rapid increase of demand for food

The communal sector is very capable of producing desirable products to meet household food security. Nevertheless, with urbanization there is a need for larger commercial producers to meet the needs of this increasing urban sector. Due to the decrease of farming population, there has been an increase in food demand and food prices which would bring about the commercialization needed for this urban demand (Peterson, 2002).

The result of increasing disposable incomes, population, growth and urbanisation can clearly be seen in increasing levels of consumption. This growth in demand for consumer goods, including food, fuels the demand for food outlets like supermarkets, which in turn drives innovation in supermarkets, such as in their functioning and procurements systems (Louw *et al.*, 2008). Increased market integration of semi communal agriculture in low-income countries appears unavoidable in the future. Rapid urbanization in developing countries, growth of the rural non-agricultural sector, and technological change in agricultural production are the major driving forces of the commercialization process. Urbanization without increased rural-urban market integration would lead to changing structures and import dependence. Growth of the rural non-agricultural sector would require increased availability of food as a major good in rural markets. This growth absorbs a significant proportion of the rural labour force dependent on purchased food. This expansion of the rural non-agricultural sector is closely linked to the growth in food production.



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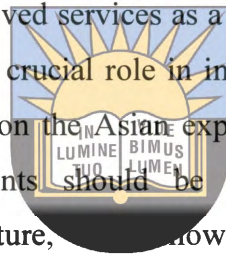
2.9.9 Developed infrastructure facilities in farming areas

Most smallholder farmers are located in the rural areas, particularly in the former homelands where both physical and institutional infrastructure limit their expansion. Lack of access to proper roads, for example, limits the ability of a farmer to transport inputs, produce and also access information.

Patel (2010) stated that it has been estimated that 15% of the agricultural produce is lost between the farm gate and the consumer because of poor roads and inappropriate storage facilities alone, adversely influencing the income of farmers. Poor rural road infrastructure limits the ability of the traders to travel to and communicate with remote farming areas,

limiting market access from these areas and eliminating competition for their produce. Easier access to market allows expansion of perishable and transport-cost intensive products. Previous studies observed that construction of rural roads almost inevitably leads to increases in agricultural production and productivity by bringing in new land into cultivation, and intensifying existing land use to take advantage of expanded market opportunities. Better roads also lowered the transaction costs of credit services, resulting in increased lending to farmers, higher demand for agricultural inputs and higher crop yields.

Patel (2010) further explained that there is a positive relationship between the increase in acreage devoted to export crop cultivation and the standard of roads and distance from the main commercial centres. There is enhanced entrepreneurship activity, sharp decline in freight and passenger charges and improved services as a result of investment in rural roads. Thus, infrastructural investments play a crucial role in inducing farmers to move towards a commercial agricultural system. Based on the Asian experience, it is often argued that the emphasis for infrastructural investments should be on improving general transport, communications, and market infrastructure, allowing the private sector to invest in commodity-specific processing, storage and marketing facilities (Pingali & Rosegrant, 1995).



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Investments in rural infrastructure lower transportation costs, increase farmers access to markets and lead to substantial agricultural expansion. It has been showed that the growths in farm productivity and non-farm rural employment are closely linked to infrastructure provision. This has considerable significance since most poor households in developing economies are in rural areas. The effects of infrastructure accentuate the process of commercialization in agriculture and rural sector. It can also lead to a conversion of latent demand into effective commercial demand. Previous studies also showed that rural infrastructure is not only an important driver for total factor productivity (TFP) growth, but also directly contributes to a substantial reduction in rural poverty (Patel, 2010).

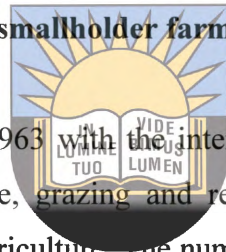
2.9.10 Government agricultural policies

Pingali and Rosegrant (1995) highlighted that government policy has a crucial role to play in ensuring that the process of commercialization and diversification of the agricultural sector is smooth. Fertile land is becoming scarcer due to demographic and economic growth and resource depletion. Greater competition for land resources, increased mobility and the

incorporation of rural areas into market economies through diversification and/or specialisation are placing increasing pressure on governments to introduce policies that give the poor secure access to land (Adams, 2004).

Governments have a difficult task to perform, because, on the one hand, continued food security needs to be assured for populations that are growing in absolute terms, and on the other hand, research and infrastructural investments need to be made for diversification out of the primary staples. The tendency of Governments to react to short term crisis situations may be counterproductive in terms of meeting long term goals of food security and income growth.

2.10 Effect of betterment planning on smallholder farming



Betterment planning was launched in 1963 with the intention of combating soil erosion. It divided land into three portions; arable, grazing and residential land. The outcomes of betterment were not good for African agriculture. The number of available fields was fixed as it only allocated fields once. This implies that people who came after allocation were not able to get land. This resulted in many people with no access to a field. Betterment had also a major impact on livestock farming, as its main focus was on controlling livestock numbers. Overgrazing resulting from excessively high livestock numbers per unit land was perceived as the principal cause of soil erosion and land degradation (Monde, 2003).

Studies conducted by Anderson and Axelsson in the former homeland of Ciskei in the province of Eastern Cape in 2005, as reflected in Textbox 1, clearly support argument of the negative effect of betterment in South African agriculture (Anderson & Axelsson, 2005).

Text box1: Betterment in Cata Location


A study conducted in Cata location revealed that Cata was one of the villages where enforcement of betterment took place. This happened during the period of 1963- 1968. This resulted to people's condition getting even worse because before the betterment enforcement inhabitants lived in a broaden area with sufficient amount of land to survive and to support themselves. Betterment enforced people to be crowded together within a limited space of land

with limited amount of land for production. After betterment stock sizes were limited and plot sizes were reduced for everyone.

Before betterment a family could own about 300 sheep and 100 cows but due to reduced land they were forced to own about 20 sheep and 10 cows. This is because the land they had access to was not enough to feed many cattle. This resulted to other stock being sold, stolen, slaughtered or even dying because of hunger.

Source: Anderson and Axelsson (2005)

2.11 Importance of collective action in stimulating subsistence agriculture

Bernard, Gabre-Madhin and Taffesse, (2007); Gabre-Madhin (2009) stated that it is increasingly recognized that the commercialization of surplus output from small-scale farming is closely linked to higher productivity, greater specialization, and higher income. These studies further emphasized that, in a  efficient markets, commercialization leads to the separation of household production decisions from consumption decisions, supporting food diversity and overall stability. However, with the increasing liberalization, globalization, and expanding agribusiness, there is a danger that smallholder producers may find it difficult to fully participate in the growing market economy (Lapar *et al.*, 2006).

Furthermore, in the face of imperfect markets and high transaction costs, many smallholders are rarely able to exploit the potential gains from commercialization. In the absence of mechanisms to cope with these constraints, smallholders are unlikely to participate in markets, when they do; they fail to realize the full benefits of participation. These challenges are particularly important in sub-Saharan Africa, where empirical evidence suggest that the proportion of farmers engaged in subsistence agriculture remains very high. Those that participate in markets often do so only at the margins because of high risks and costs associated with markets (Bernard *et al.*, 2007). Thus, it is very important to develop a system of collective action in order to cope with the constraints that these subsistence farmers are faced with. Lapar *et al.*(2006) supported the argument that in this regard, the principal tools for stimulating commercialization through reducing transactions costs are institutional innovations such as contract farming, out-grower schemes, cooperatives, and vertical integration.

2.11.1 Cooperatives

A common form of collective action to address market access problems is a participatory, farmer-led cooperative that handles input purchasing and distribution and output marketing, usually after some form of bulking or processing. Farmers gain the benefit of assured supplies of the right inputs at the right time, frequent supplies, and an assured market for the output at a price that is not always known in advance, but applied equally to all farmers in given location and time period. In short, participatory cooperatives are very helpful in overcoming market access barriers to assets, information, services, as well as negotiating market access with the market the smallholders wish to supply. Producer cooperatives can offer processors/marketers the advantage of an assured supply of the commodity at known intervals at a fixed price and a controlled quality. Cooperatives also negotiate collateralized loans for farmers. For example they would take a loan and put the land they are using as collateral (Holloway, Nicholson & Delgado, 1999).



2.11.2 Contract farming

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Contract farming is considered by many as a crucial means for industrialising agriculture. It is regarded as a strategy for agricultural transformation in developing countries because it has the potential to solve agricultural marketing problems. Contract farming is also regarded as a vehicle for modernisation, as it gives small farmers access to modern technologies, quality control, marketing and other services (Kudadjie-Freeman, Richards & Struik, 2008). Contract farming has successfully enabled smallholder farmers in developing countries to commercialize their farming operations through the creation of market linkages, both domestic and international. Evidence from Uganda illustrates that contract farming has been traditionally restricted to plantation crops (sugarcane and tea) where out-growers have been supplementing production of large processing agribusiness firms. This has encouraged commercialization through specialization. These contract farming schemes have attributed for played a key role in increasing the profitability of crop farming, reducing marketing risks, and above all opening up new markets for non traditional cash crops both at domestic and international level (Elepu & Nalukenge, 2009).

Elepu and Nalukenge (2009) further explain that however, while contract farming offers a huge opportunity for commercializing smallholder agriculture, smallholder farmers have reportedly experienced some contractual problems in dealing with large agribusiness firms, resulting in smallholder farmers giving up contract farming. Similarly, agribusinesses have also reportedly encountered some contractual problems when dealing with some smallholder farmers that could have led to the exclusion of the latter from contract farming. Hence, there is need to enact, implement, and enforce favourable contractual laws and policies to support both smallholder farmers and agribusiness firms in their contractual production and marketing arrangements. Additionally, there is also need to identify suitable trade policies that have the potential to increase the participation of smallholder farmers in contract farming for agricultural commercialization



2.12 Commercialization of subsistence agriculture in South Africa

Paterson (2002) emphasised that South Africa is a net exporter of food products due to a large commercial sector. This has ensured national food security not only for South Africa, but has also added security to the Southern African region. However, 70.5% of South African commercial sector is owned by whites while the subsistence sector which is owned by blacks only cover 11% of the land. This is an unacceptable situation in Africa. To ensure rural stability it is believed that at least 30% of the commercial sector will need to be settled by black farmers. As mentioned earlier, this transition has not taken place at all during the first six years of independence.

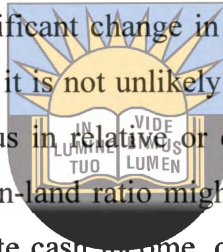
2.12.1 Determinants of commercialization of subsistence agriculture

According to Lerman (2004), the commercial farmers are characterized by larger land holdings, a larger amount of fertile irrigated land, and more animals. They also command a larger pool of potential family labour, and the head of the household works full time on the family farm in a significantly higher percentage of cases. Finally, commercial farmers allocate much greater sums of money to payment for mechanical field services (both in absolute terms and per hectare). Concerning the exogenous determinants of commercialization, among the most important driving forces are population change, availability of new technologies, markets and infrastructure, overall economic growth, and,

finally, government policy related to these. Some of these factors may have more immediate and others only long-term effects on the farmer's decision to become more integrated in the market (von Braun, Haen & Blanken, 2001).

2.12.1.1 Demographic change

Demographic change is certainly a key determinant in the long run. It may facilitate or impede the commercialization of products, depending on the availability of resources. If an expansion of the cultivated area is still possible, so that the marginal labour productivity exceeds the marginal subsistence requirements, population growth may in fact enable an increase of the marketable surplus. Yet this situation has certainly become rare. Under the conditions in Rwanda, and with no significant change in the people's preference for a high degree of self-sufficiency in staple food, it is not unlikely that population growth might lead to a reduced volume of marketed surplus in relative or even absolute terms. On the other hand, it is likely that an increased person-land ratio might lead to an increased demand for off-farm employment in order to generate cash income, of which a high proportion will be spent on food (von Braun *et al.*, 2001).



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2.12.1.2 New Technologies

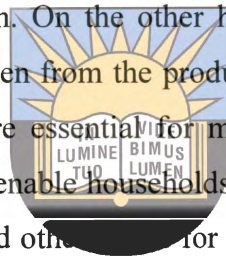
The availability of new technologies, improved seeds and agronomic practices, on the one hand, and investment in infrastructure, price incentives from extended demand for agricultural products, and attractive wages and employment opportunities, on the other, are the other factors that facilitate the commercialization process. Agricultural technology and commercialization are complementary stimulators of the rural economic growth process. Specialization and commercialization of farming households within a more diversified economy is part of the development process (von Braun, 1995).

2.12.1.3 Asset holdings

Gabre-Madhin (2009) highlighted that asset ownership allows smallholder farmers to exploit opportunities from market reform through increased transaction costs as well as increased productivity. Asset ownership, in particular access to credit, notably impacts productivity of

existing assets, which would allow the poor to expand scale of present activities, or enter into value added activities. For example, the importance of financial capital is particularly evident for the underlying competitiveness of the poor in land markets.

According to Jaleta, Gebremedhin, and Hoekstra (2009) household asset holdings, both in terms of capital and as a buffer to mitigate any production and market related shocks are relevant in a smallholder commercialization process. The household asset holding on consumption side perspective is assumed to have role in mitigating unexpected shocks in the commercialization process. Decrease in production or low market prices may affect the household income and consumption adversely. The implication is that, with absence of credits markets for consumption, assets liquidation may be only option available to households to smooth their consumption. On the other hand, the importance of assets for smallholder commercialization can be seen from the production side. Assets like land, oxen, farm implements, and human capital are essential for marketable surplus production at a smallholder level. Larger farm holdings enable households to exercise economies of scale by adopting modern technologies. These and other factors for surplus production become critical especially when markets for land and oxen power are completely missing or less functional. When factor markets are imperfect, resource ownership becomes critical for efficiency.



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Household asset holding in the form of human capital is one of the crucial elements in commercializing smallholder agriculture. Human capital comprises education, experience, skills, capabilities etc. of the household members engaged in pursuing new opportunities that could change the household's overall living standards (Jaleta *et al.*, 2009). Gebreselassie and Ludi (2010) provide evidence that even though the subsistence farmers respond positively to outside interventions that aim to enhance the integration of their farms into markets, differences in asset holdings are likely to be a big determinant of who responds better to incentives for commercialization. Farm size influences household responsiveness to the commercialization scheme positively and significantly.


2.12.1.4 Transaction costs

Transaction costs, that is, observable and non-observable costs associated with exchange, are embodiment of access barriers to market participation by resource poor smallholders. These

include the costs of searching for a trading partner, of bargaining, monitoring, enforcement and eventually transferring the product to its destination (Makhura, Kirsten & Degaldo, 2001). Previous studies indicated that improving market participation by subsistence farmers through better rural infrastructure, especially rural transport, has a strong potential for reducing transaction costs. Reduction of transaction costs and the introduction of quality-enhancing techniques will increase the incentives for rural households to participate in the production of exportable products (Diop, Brenton & Asarkaya, 2005).

2.12.1.5 Markets and their integration

The existence of low-cost, well-integrated and efficient rural markets is a key element in agricultural commercialization (Jaleta *et al.*, 2009). Riddell *et al.* (2006) stated that with irrigation system onsite production expand to an extent that domestic prices fall to a level where greater returns are achievable by exporting across the national boundary. This integrates the domestic market with markets in other countries. Once this happens, prices at each point in domestic marketing chains tend to converge towards the selling price in the most remunerative foreign market net of the processing and marketing costs costs incurred in delivering the product to the markets.



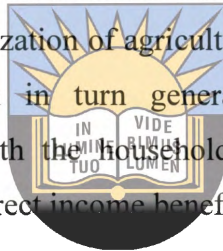
The logo of the University of Fort Hare is a circular emblem. It features a sun with rays at the top, a book in the center, and the motto 'LUMINE BIMUS TUO LUMEN' below the book. The text 'University of Fort Hare' is written in a serif font across the middle of the emblem, and 'Together in Excellence' is written in a smaller font at the bottom.

Jaleta *et al.* (2009) explained that well-integrated markets transmit excess supply to distant locations, and because of this, the returns to increased output due to technology adoption diminish less quickly in well-integrated markets than in segmented or poorly integrated markets. Market integration is an alternative approach to stabilize prices, allocate resources and rectify market imperfections like entrenched monopolies and inadequate and costly information transmission. The rectification of market imperfections smoothens the way to attaining market efficiency, which in turn, facilitates the attainment of agricultural development and equal distribution of income. Increased market integration of semi subsistence agriculture in low-income countries appears unavoidable in the future (von Braun and Kennedy, 1986).

2.12.2 Impacts of commercializing subsistence farming on smallholder welfare

2.12.2.1 Income

Increased farm commercialization is expected to lead to higher average farm incomes and lower farm income inequality. It has been shown that an increase in farm size leads to higher household incomes and greater readiness to engage in sale of the farm products, while commercialization of farm activity in turn generates higher household incomes (Kan, Kimhi & Lerman, 2006). This shift towards more commercialization has also been found to contribute positively to agricultural income. Impact of smallholder commercialization was shown to be positive in Kenya; where farmers that were participating in the sugarcane benefited from it through higher agricultural incomes. Much of the difference in income was related to agricultural sales. Commercialization of agriculture benefits the poor by increasing agricultural labour productivity which in turn generates employment in low-capital smallholder agricultural production. Both the households that are commercializing their production and hired labourers receive direct income benefits (Olwande & Mathenge, 2010).



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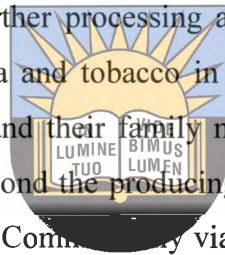
2.12.2.2 Food availability and nutrition *Together in Excellence*

According to von Braun and Kennedy (1986), there are a variety of mechanisms through which commercialization (cash crop production) can affect consumption and nutritional status. They further explain a conceptual framework developed by Pinstруп-Andersen which specifies that cash crop production may affect national and local food availability, the ability and desire of households to obtain food, intra household distribution of food, and health and sanitary factors. Expanded cash crop production is likely to influence local food availability in two ways. First, to the extent that land and other resources are shifted from growing food for local consumption to cash crops, the food supplies in local markets from local production would decrease. Second, if farmers, agricultural labourers, and other rural people earn higher incomes from cash crop production, a part of these higher incomes would be spent on food. Thus, local or community food supplies would decrease while food demand increases. The result would be upward pressure on local food prices, having two effects: first, higher prices would lead to an increase in input intensity on the remaining food production area, and second, an effective food marketing system would provide increased food supplies to the community, either from other regions or from additional food imports. Evidence from cases

where cash crop production was introduced or expanded indicates, however, that a sufficient inflow of food to avoid significant increases in local food prices frequently does not occur.

2.12.2.3 Employment effects

Commercialization and diversification of agriculture can affect the structure and level of employment. Changes may take place in the use of hired labour versus family labour and in the distribution of family labour by gender, as well as the level of labour input for field operations and for processing (von Braun, 1995). Jaleta *et al.* (2009) stated that usually it is believed that high-value cash crops are labour intensive in their production and targeting these crops in the commercialization process helps to absorb surplus family labour. Moreover, commodities that require further processing at a village level before marketing (e.g. commodities like soybean, cassava and tobacco in the uplands of Java) could create employment opportunities for farmers and their family members and also promote income distribution among village members beyond the producing household and particularly to the poorest class of people in a community. Commercially viable small farms are market driven, and in Asia and Africa they generate significant marketed surpluses, and are a powerful engine of rural economic growth, creating jobs for others in both the farm and rural nonfarm economy. Investing in them is also an indirect way of helping many of the poor (Peter, 2011).



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2.13 Commercialization trends in Eastern Cape Province

Throughout Africa efforts are being made by local governments and others to encourage subsistence farmers to become commercial producers. Yet in South Africa, after 17 years of independence and great effort and expenditure on the rural sector, there has been little commercialization of production from the rural sector. Still 86% of the agricultural land is commercially run basically by whites and 14% is in the subsistence sector run basically by blacks (Paterson, 2002).

AGRISETA (2010) provide evidence that there has been a clear downward trend in the number of commercial farming enterprises. This underscores the need to develop the commercial agriculture sector to maintain South Africa's food sustainability potential and support interventions to develop skills across the agricultural sector. In Table 1 it has been

shown that there has been a decline of 10.97% in commercial farming of the Eastern Cape Province. This indicates that instead of an increase in commercialization the province as a whole is seeking for, commercial farms are declining.

Table 2.1: Commercial farming enterprises by province-2002 and 2007

Province	2002	2007	Growth
Eastern Cape	4 376	3 896	- 10.97
Free State	8 531	7 515	- 11.91
Gauteng	2 206	2 378	7.80
KwaZulu-Natal	4 038	3 560	- 11.84
Limpopo	2 915	2 657	- 8.85
Mpumalanga	5 104	3 376	- 33.86
North West	5 349	4 692	- 12.28
Northern Cape	6 114	5 226	- 14.52
Western Cape	7 187	6 682	- 7.03
Total	45 818	39 982	- 12.74

Source: AGRISETA (2010)

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StatsSA (2004) highlighted that according to the results of the Census of Agriculture there were 45 818 active commercial farming units in South Africa in 2002. This represents a decrease of 12 162 farming units since the last Census of Agriculture in 1993. On the other hand in 2007, there were 39 982 commercial farms in South Africa as opposed to the 45 818 registered in 2002. This indicates the downward trend in a number of active commercial farming units in South Africa. The Figure 2.1 illustrates the downward trend of commercial farming units in South Africa. This indicates loss of competitiveness of commercial farming relative to other economic activities.

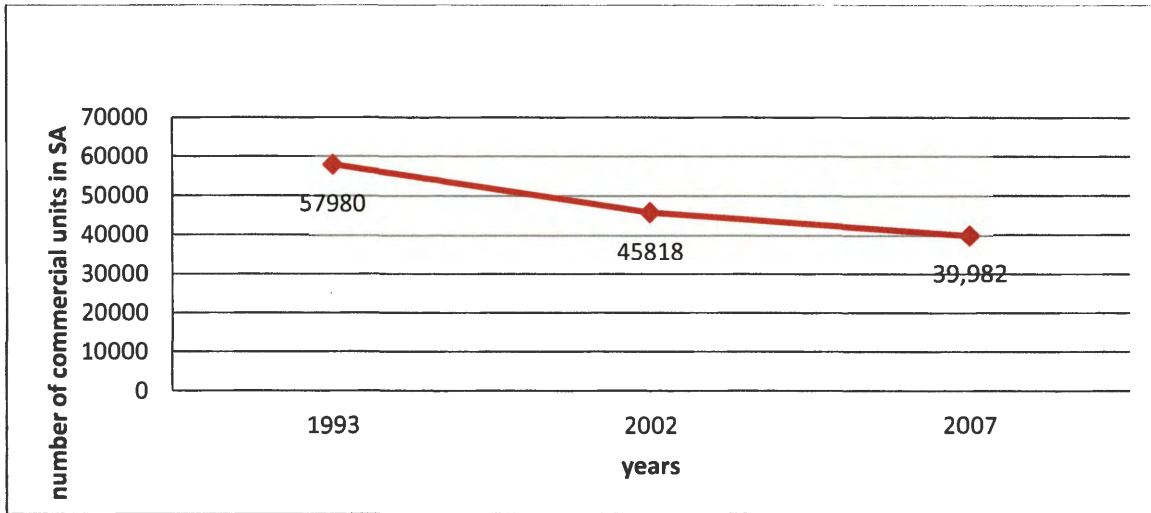


Figure 2.2: Commercial farming units in South Africa since 1993 to 2000

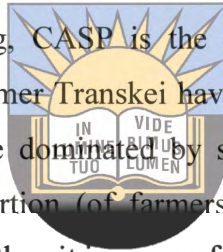
Source: StatsSA (2004)

The downward trend in commercial farming indicates the outmigration of commercial farms from agriculture to industrial occupation. According to Paterson (2002) the possible reason for this maybe that subsistence farmers do not want to farm commercially. He further explained that from experiences in Africa only a very small percentage want to farm commercially. Most of them would rather have a good job in industry. Because of the lack of interest in commercialization by subsistence farmers Peterson (2002) further indicates that commercialization can only be brought about in the presence of a business spirit amongst these people, which seems not to exist or very few people appear to have it. Therefore, it is very clear that unless people are exposed to business they cannot be expected to have an entrepreneurial spirit.

2.14 Causes of the declining trends in the Eastern Cape Province

The first cause arises from the slow progress in the transfer of land. Recent studies by AGRISETA (2010) indicated that from 1994 to 2009 only 6.9% of agricultural land transferred to beneficiaries through both the redistribution and restitution programmes far short of the 30% government has targeted for the 2014 deadline. Tshuma (2009) associated such slow progress to the fact that there is not much land available for farming in the country (due to the current land tenure system which has not addressed the inequalities created by the apartheid government). As a result the South African smallholder irrigation schemes are considered as multi-farmer irrigation projects. This means that small-scale irrigators in South still do not have enough land for farming purposes.

The second cause entails from government failure to support productive use of transferred land. Hall and Aliber (2010) reported that it is a concern that in the Eastern Cape most small black farmers cannot access production loan schemes for, particularly, CASP support because of the priority placed on land reform (i.e. projects outside the communal areas) and on fixed infrastructure, which requires that the beneficiary own the land in question (which also in effect excludes the many farmers in the former Ciskei and Transkei regions). Hall and Aliber (2010) further indicated that the majority of smallholder farmers have been complaining about the critical issue of production loan schemes, however, there is no effort put by government to resolve the problem. It has been indicated that the biggest need of production loan is in the communal areas of the former Transkei. Since the majority of smallholder farmers depend on government funding, CASP is the only funding available for them. However, smallholder farmers of the former Transkei have access to 30% of CASP because communal areas of former Transkei are dominated by smallholder farmers and have not benefited from land reform. The proportion (of farmers getting CASP support) is much higher among land reform beneficiaries [than it is among farmers in the communal areas].



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The last cause arises from the withdrawal of government in managing the existing small-scale irrigation schemes. As already stated, after the initiation of small-scale irrigation schemes, government, through its agencies, basically ran and managed them on behalf of small-scale farmers. Tshuma (2009) clarified that all the schemes under the Agriculture and Rural Development Corporation (ARDC) were fully subsidized, meaning that the government owned most of the schemes economic capital resources such as machinery, water through the Department of Water Affairs and Forestry (DWAF) and even the working capital used in the schemes thereby leaving the farmers only with the responsibility of weeding and harvesting. However, despite huge investments, the performance of most small-scale irrigation schemes has been poor and falls far short of the expectations of engineers, politicians, development agencies and the participants themselves this government support introduced in the mid-nineties was withdrawn, leaving the farmers with the responsibility of acquiring their own resources. Van Averbeke, Denison and Mnkeni (2011) provide evidence that in 2010, smallholder irrigation schemes covered 47 667 ha, compared to the 1 675 822 ha of registered irrigation land in 2008, of which 1 399 221 ha was irrigated annually. The total population of

34 158 plot-holders on smallholder irrigation schemes in 2010 was also relatively small compared to the 1.3 million Black homesteads that had access to land for cultivation.

Riddell *et al.* (2006) supported the argument that investment in agricultural water development in sub-Saharan Africa has declined in the past two decades. The main reason for this decline is thought to be the consequence of concerns over the disappointing performance of past investments in terms of: (i) returns to investment; and (ii) sustainability. This has resulted in considerably reduced efficiency, and in some cases, complete collapse of certain schemes.

2.15 Analytical and Estimation Techniques



One of the study objectives was to understand the role of water use patterns in transition from subsistence communal agriculture to smallholder irrigation agriculture in the former Ciskei homeland area of Eastern Cape Province. The study specifically explored the potential challenges that hold-up the transition of farmers from subsistence communal agriculture towards market-oriented production. The interest of the study developed from the fact that agricultural commercialization is viewed as one of the well-known conceptual and theoretical issues world-wide. Literature indicates that many smallholder farmers still find it difficult to participate in markets because of numerous constraints and barriers. Several studies highlighted that market participation of smallholder farmers is affected by numerous factors, which include government policies, production factors, socio-economic factors, cultural factors and external factors. These factors can lead to positive or negative effects, which could result to improvement or diminution of the smallholder farmers' livelihood. As a result many studies have been conducted on the issue to measure the extent to which these factors affect the commercialization of smallholder farmers. Therefore, there is a burgeoning stock of literature presenting different models on agricultural commercialization and how it is measured in the smallholder sector of developing countries.

Recent literature (Byron, 2012) on the subject indicates that to date, top-down macro and trade policy interventions have not been enough to stimulate smallholder market participation and agricultural transformation as expected. The study carried out by Thinah Moyo in

Zimbabwe, provided an evidence of poor market participation by smallholder farmers “a relatively small proportion of rural households sell staple food grains and for those who do sell, the quantity is often small”..... (Moyo, 2010). Previous researchers have employed a two step approach to measure market participation. The first step involves the estimation of market participation decision, that is, the probability of participation while the second step involves the estimation of quantity decisions for those households who decided to participate in the first stage. Many approaches have been adopted in the research of agricultural commercialization. Randela et al. (2008) and Makhura (2001) are among the studies that devoted time to identify factors that affect the decision of agricultural household of whether to participate in markets or not.

Various studies which involve market participation of smallholder farmers have used this two- step approach.. Rios et al. (2009) used this approach in their study on farm productivity and household market participation. Rios et al. (2009) intended to identify the relationship between farm productivity and household market participation. In addition, Moyo (2010) used the same approach in his study on identifying determinants of the participation of smallholder farmers in the marketing of small grains and strategies for improving their participation in Zimbabwe. The data used were obtained through administering of structured questionnaires to farmers to convey their judgment on market participation.



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The questions of what determine whether or not farmers participate in markets and which factors greatly influence the decision of market participation have been analysed at various levels by previous research. Once the household decision of market participation is determined, the factors influencing the decision are determined by means of various statistical and econometric procedures. Moyo (2010) in his study used a multiple regression analysis, probit model as well as discriminant function analysis. Various studies that attempted to identify the factors that influence farmers’ decision of market participation have applied either probit or logistic regression analysis. For example, a study on access to small-scale irrigation in the context of market participation in Ethiopia has adopted the two- step model. The first step involves the estimation of probit model to estimate the household participation decisions. The second step involves a truncated regression to model quantity decisions of the household that participate in markets. This model was used because there was no representative (random) sample from the population. This normally happens when the

survey targets a sub-group of the population. For example, the study of Hagos et al. (2008) intended to find the level of market participation of smallholder farmers; this implies that people who are not participating in market are excluded from the sample. Thus the data would be missing for all the persons who are not selling.

On the other hand, a study in Mpumalanga to identify farm level factors that influence or enhance market participation of cotton smallholder farmers used a different approach. Randela *et al.* (2009) fitted a logistic regression model with household commercialization index (HCI) as the dependent variable. The index measures the ratio of the gross value of crop sales by household in a year to the gross value of all crops produced by the same household in the same year expressed as a percentage. In value terms the index can take any value between 0 and 1. The index measures the extent to which household crop production is oriented toward the market. A value of zero or close to zero would signify a subsistence oriented household and the closer the index is to 100 in terms of percentage or 1 in value terms, the higher the degree of commercialization. It was further highlighted that in cotton industry, to be regarded as a commercial farmer a commercialization index of 0.8 (80%) should be achieved. Randela et al. (2009) adopted this index in order to differentiate the HCI of the surveyed households. This was done to enable transformation of HCI to binary responses where commercialization index of less than 0.8 (80%) were assigned a dummy variable of 0 and 1 otherwise. Sampled farmers whose HCI was less than 0.8 were referred to as aspirant commercial farmers (low commercialization) and those who achieved higher HCI were referred to as commercial farmers (high commercialization).



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2.16 Chapter Summary

In most countries of Sub-Saharan Africa, over 96 percent of farmers are small, farming less than 5 ha, usually with over two thirds having less than one hectare. Small-scale farms account for over 90 percent of agricultural production. Literature indicates that Sub-Saharan African agriculture depends mostly on rainfall for its productivity. Only 4% of arable land in the SSA region is irrigated. Therefore, there is ample scope for increased irrigation in many parts of SSA, particularly for small-scale irrigation and water harvesting. However, it has been found out that throughout Africa, efforts are being made by local government and others to encourage subsistence farmers to become commercial producers. Yet, in South Africa,

after 17 years of independence and great effort and expenditure on the rural sector, there has been little commercialization of production from the rural sector. Still 86% of the agricultural land is commercially run basically by whites and 14% is in the subsistence sector comprised basically of blacks.



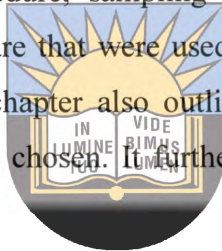
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CHAPTER 3

METHODOLOGY

3.1 Introduction

This chapter reviews the research methods used in collecting and analyzing data from emerging smallholder farmers in the Amathole district Municipality. It starts by describing the study area. It follows by explaining the data which include the following sub sections: population (sample frame) and, the observation schedule that was followed, sampling procedure, selection of study area, sample size for the study, data which focuses on description of variable-collection procedure, sampling and analytical procedure. It also presents data analysis, that is the software that were used to run the data and the statistical model used to analyze the data. This chapter also outlines the model for data processing, giving reasons why the model has been chosen. It further describes the key data variables used in the model.



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3.2 Description of study area

The research was conducted in both Nkonkobe local municipality and Ngqushwa local municipality specifically, Melani and Ndlambe villages, respectively. Ngqushwa Local Municipality falls within the jurisdiction of the Amathole District Municipality which is situated in the Eastern Cape Province and covers an area of 23 573km². The Ngqushwa municipal area covers 2245 km² which accounts for 10% of the district municipal area. The administrative office of the Municipality is in Peddie and the municipal area is divided into 14 wards. Ngqushwa is located in the west of the Amathole district and consists of two towns, Peddie and Hamburg, and a portion of King Williams Town villages. It is one of the eight municipalities that fall within the Amathole District Municipality. Ngqushwa Municipality consists of 118 villages. Ngqushwa is bordered by the Great Fish River to the west and the Keiskamma River to the East. The southern boundary comprises a part of the coastline of the Indian Ocean (IDP, 2011).

Nkonkobe Municipality falls under the former Ciskei homeland and is named after the Winterberg mountain range. The Municipality comprises of 141 suburbs, which are divided into 21 wards. Nkonkobe municipality is mainly rural, incorporating the now disestablished Alice Transitional Local Council (TLC), Fort Beaufort TLC, Middledrift TLC, Hogsback Local Council (LC), Seymour TLC, Victoria East Transitional Rural Council (TRC), Fort Beaufort TRC, Mpofo TRC and Middledrift TRC (Vengayi, 2009). Fort Beaufort is the capital for Nkonkobe Municipality. It covers an area of 3 725 square kilometres and accounts for 16 percent of the surface area of the Amathole's District Municipality. The municipality has 128 660 inhabitants, which represents 8.7% of the total population of Amathole's District Municipality. The municipality has an average population density of 43 persons per square kilometre.



3.5.1 Geographic area of the study

The target area of the study is the Peddie district, situated in the coastal part of the Central Region of the Eastern Cape Province. One of the study areas represents irrigated environment. Ndlambe village which is part of the irrigation scheme was representing irrigated environment. The target population of this study were holders of irrigated small plots and allotments. The second study area represented a rain-fed (manual irrigators) farming environment and presents data obtained from Alice district.

The Ndlambe village is found in the district of Peddie, known locally as Ngqushwa, and is situated in the Eastern Cape Province. The Peddie district comprises an area of some 176 000 ha or (1760 km²) and it is situated between the Great Fish and Keiskamma Rivers, 65 km east of Grahamstown and 55 km south-west King William's Town. Before the establishment of the new national government in South Africa in 1994, Peddie District formed part of 35 Ciskei. Generally, the physical environment in the former homelands is characterized by severely degraded land and soil erosion. It is located between the latitude 33°11'46"S and 33.196°S and longitude 27°06'58"E and 27.116°E. The soils in Peddie have been characterized as arable, with moderate to severe limitations, due to a combination of low, unreliable rainfall and shallow soils (Grwambi, 2005). Peddie normally receives about 412mm of rain per year, with most rainfall occurring mainly during summer. Peddie receives the lowest rainfall (13mm) in July and the highest (61mm) in March. The monthly distribution of average daily maximum temperatures shows that the average midday

temperatures for Peddie range from 20°C in July to 26.8°C in February. The region is the coldest during July when the temperature drops to 7.6°C on average during the night.

Melani is a rural village found in the Alice district. It is located approximately 12 km North of Alice Town and the University of Fort Hare, Eastern Cape, South Africa; it consists of approximately 500 households, housing approximately 3000 people with a clear 70% majority between the working age of 20 and 50 years and characterized by the lack of skills. Alice is situated at 32 ° 46' 51" S latitude and 26 ° 51' 43" E longitude, at the altitude of 558m (IDP, 2012). Alice normally receives about 386mm of rain per year, with most rainfall occurring mainly during summer. Alice receives the lowest rainfall (8mm) in July and the highest (59mm) in March. The monthly distribution of average daily maximum temperatures shows that the average midday temperatures for Alice range from 19°C in June to 27.6°C in February. The region is the coldest during July when the temperature drops to 5°C on average during the night. Both local municipalities are shown in Figure 3.1.

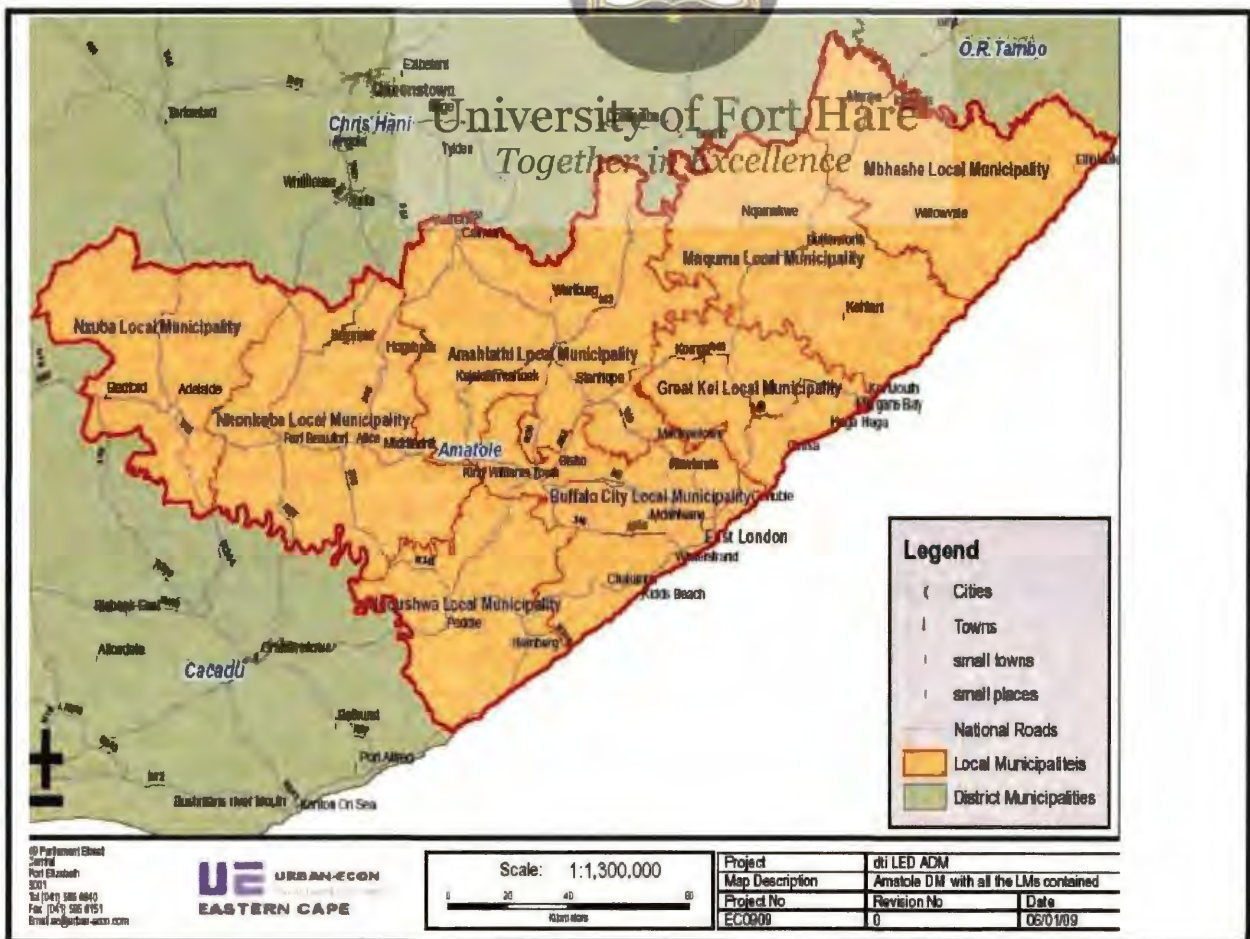
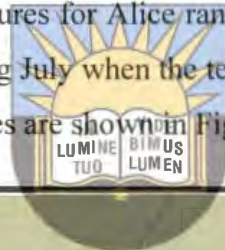


Figure 3.1: Map of study area
 Source: Amathole District Municipality, IDP (2012)

3.3 Data

3.3.1 The sampling frame

The sampling frame was composed of homestead gardeners and smallholder irrigation farmers involved in one or more of the following lines of production, and are beneficiaries of government support services: vegetable production and field crop production. The study took place in two local municipalities of Amathole district municipality (ADM), namely, Ngqushwa and Nkonkobe local municipalities.

3.3.2 Observation schedule

The prospective respondents were visited prior to finalising the sample of respondents. The purpose of this was to ascertain that each farm business qualifies as an operational commercial/ emerging enterprise, and also to identify specific issues to be clarified during the interviewing phase. The following aspects were considered during the observation phase:

- The farming households and available smallholder irrigation schemes at the specific study area were observed.
- The level of farming, that is, commercial, emerging or small-scale farming was observed. It was assessed through assets owned, markets for the produce and labour.

3.3.3 Sampling technique

Sampling involves the determination of the sample size giving due cognizance to the fact that it should be representative enough to be used to conduct reliable statistical analysis. Sample size depends largely on the degree to which the sample population approximates the characteristics and qualities resident in the general population (Montshwe, 2006). Brown (2000) indicated that in conventional research methodology, a distinction is often made between probability samples and non-probability samples. The first category includes random samples, stratified samples, systematic samples and clustered samples, while the second category includes accidental samples, purposive samples and quota samples as well as snow-ball samples.



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The sample in this study did not neatly fall into any of these specific categories in that the sampling decision initially was non-probabilistic since there was a deliberate intention to obtain respondents that were part of smallholder irrigation scheme and those that depended on rain fed agriculture. The study area, therefore, had to have a sufficient number of farmers from whom one could easily choose respondents randomly. This makes it clear, therefore, that the sampling approach was purposive in the choice of study areas, but random when choosing respondents within the study areas.

The reason for adopting purposive sampling in this study is that the study was interested in areas where there is irrigation scheme. Farmers were identified through the Department of Agriculture in both Nkonkobe and Ngqushwa local municipality, and preference was given to communal areas which have a greater number of homestead gardeners and smallholder irrigated plots.



3.3.4 Selection of study area

The aim of the study is to explore the impact of water use patterns on the trend in commercialization of communal agriculture in the two villages namely Melani and Ndlambe of Nkonkobe and Ngqushwa local municipalities in the Eastern Cape Province of South Africa. The two local municipalities were selected because the main focus was to compare the market participation of irrigators and non-irrigators. Ngqushwa was representing farmers who have access to irrigation scheme while Nkonkobe was representing farmers who depend on rain-fed production.

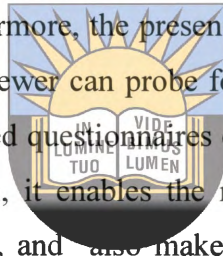
3.3.5 Sample size for the study

As a way of improving data quality, a semi-structured questionnaire consisting of both close-ended and open-ended questions was administered for data collection. A total of 128 households were sampled for the purposes of this study. The random sample was composed of 64 households from Melani village and 64 from Ndlambe village.

3.3.6 Method of data collection

3.3.6.1 Questionnaire

A questionnaire was designed as a tool for primary data collection. The questionnaire was used to collect both qualitative and quantitative data. The questionnaire was administered to respondents (farmers) through face-to-face interviews. Face-to-face interviews were chosen because they have several advantages over the other methods. The main advantage of face-to-face is that the researcher can adapt the questions as necessary, clarify doubt and ensure that the responses are properly understood, by repeating or rephrasing the questions. The researcher can also pick up nonverbal cues from the respondent. In addition, by reading the facial expression of the respondent the interviewer can easily understand what the respondent wants to tell them about anything. Furthermore, the presence of the interviewer increases the quality of the responses since the interviewer can probe for more specific answers. In other words, the use of interviewer-administered questionnaires ensures minimal loss of data when compared to other methods. In addition, it enables the researcher to describe the current situation in a particular area of concern, and also makes it possible for the researcher to assess what a farmer knows (knowledge and information), what the farmer likes (values and preferences) and what the emerging farmer thinks (attitudes and beliefs) (Brown, 2000).



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3.3.7 Variables that were collected

The questionnaire was designed to capture data on factors that influence market participation. The data that was collected include:

- demographic data (age, sex, marital status, and highest educational level attained),
- factors of production (land, labour, capital, human and natural resources), infrastructure development (irrigation system),
- quantity sold to the market, market proximity,
- market institutional arrangements (legal support) and
- Difficulties involved in market exchange

3.4 Description and analysis of data

The Statistical Package for Social Scientists (SPSS) and STATA were used to run the data collected from smallholder and emerging farmers in the two areas. To analyze data, descriptive and multivariate statistical analyses (the binary logistic and truncated regression model) were used to test the hypotheses. The model that was used in this study determines factors influencing the probability of smallholder farmers' participation in markets.

3.4.1 Descriptive statistics, non parametric correlation and cross tabulation

Descriptive statistics were used to describe the basic features of the sample households by means of simple summaries and measures of central tendency. These are useful in analyzing household characteristics as well as analyzing the relationship between variables. This means that they describe what is being shown by the data. Therefore, descriptive statistics were used because they present quantitative data in a manageable form.



Cross tabulation is a type of a bivariate analysis that involves testing whether a relationship or an association exists between two variables. Cross tabulation presents tests of association, directional and symmetrical measures.

For purposes of estimating level of market participation and market participation by farmers, non parametric correlation was used to establish whether there exists a relationship between several factors. Specifically, the two-tailed Pearson's Correlation Matrix was computed which provides correlation coefficients that indicates the strength and direction of the linear relationships between variables. The approach was used to estimate the possible correlation between residential farming experience, irrigation project membership, type of irrigation used, membership on farmers association, total land cultivated, access to market, market participation and level of market participation. Specifically, the two-tailed Pearson's correlation analysis was computed to indicate the strength and direction of the linear relationships rather than to assess causality.

For the purpose of estimating level of market participation, household commercialisation index (HCI) measure was used. The HCI measure is defined as follows:

HCI= $\frac{\text{Gross value of crop sales}}{\text{Gross value of all crop production}}$

3.4.2 Methods and procedures

This section presents the econometric models that were used. The study used aimed to investigate factors that affect commercialisation of smallholder farmers as well as degree of commercialisation. For this reason for two different econometric models were used in order to estimate commercialisation as well as level of commercialisation.

3.4.2.1 Econometric Model-Binomial logistic regression model

The binomial logistic regression model (BLR) was used to test the factors that influence small scale farmers participating in market oriented agriculture. Binary logistic regression can be used to analyze relationships between a dichotomous dependent variable and metric or dichotomous independent variables. In other words, binary logistic regression can be used to predict a dependent variable, based on continuous and/or categorical independent variables, where the dependent variable takes zero or one (Jari, 2009). Binomial logistic regression does not make any assumptions of normality, linearity, and homogeneity of variance for the independent variables but requires that the independent variables be metric or dichotomous.

The model has been chosen because it allows one to analyse data where participants are faced with two mutually exclusive choices. In this study, smallholder farmers are faced with two choices, which are; to participate in market oriented agriculture or not to participate in market oriented agriculture. In the BLR model, participation in market is a function of the probability that a particular subject was in one of the categories. In this study, decisions are dichotomous criterion variables, that is, farmers decision must take one of only two possible choices, that is, whether participate or do not participate while farmers' economic, social, agronomic and institutional perceptions towards market participation are the predictor variables. It follows that P_i represents the probability of participating in market and $(1 - P_i)$ represents the probability of not participating. A typical logistic regression model is of the form:

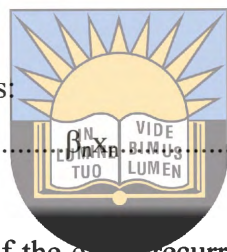
$$\text{Logit}(P_i) = \ln(P_i / 1 - P_i) = \alpha + \beta_1 X_1 + \dots + \beta_n X_n + U_t \dots \dots \dots (1)$$

Where: $\ln(P_i / 1 - P_i)$ = logit for market participation choices

- Pi = participating in markets
- 1-Pi = not participating in markets
- β = coefficient to be estimated
- X represents covariates
- Ut = error term

In this study, the dependent variable (market participation) is a logit, which is the natural log of the odds, that is,

$$\ln(\text{ODDS}) = \ln \{MP/1 - MP\} = \alpha + b(x_1 \dots x_{18}) = \text{Logit}(MP) \dots \dots \dots (2)$$



This equation can be expanded as follows:

$$\text{Logit}(MP) = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 \dots \dots \dots (3)$$

Where MP is the predicted probability of the event recurring which is coded with 1 (market participation) rather than with 0 (not participating), $1 - MP$ is the predicted probability of the other decision and $X_1 \dots X_{18}$ represents the first up to the eighteenth predictor variables. According to the design of the questionnaire, it is expected that there will be eighteen predictor variables. α is the constant term which represents market participation without the effect of any constraints, *ceteris paribus*.

Participation of smallholder farmers in the markets can be described in different ways, but for the purpose of this study participation means whether farmers sell or do not sell their produce in markets. The dependent variable considered takes the form of a binary variable (i.e. either 1 or 0), where 1 denotes that a farmer participates in the markets and 0 denotes that a farmer does not participate. The method of estimation has been strongly and clearly guided by the form of the dependent variable considered in this study, since the objective is to determine the probability of smallholder farmers participating in markets and the factors that will affect it. Binary logistic regression model is useful in analysing data where the study was interested in finding the likelihood of a certain event occurring. In other words, using data from relevant independent variables, binary logistic regression is used to predict the probability (p) of occurrence, not necessarily getting a numerical value for a dependent variable (Jari, 2009). Relationship between dependent and independent variable can be explained using

several methods. Such methods include linear regression models, probit analysis, log-linear regression and discriminant analysis (Mandikiana, 2011). However, binomial logistic regression was chosen because it has more advantages, especially when dealing with qualitative dependent variables and when the dependent variable has two categories. Most importantly, BLR does not assume a linear relationship between the dependent and independent variables; independent variables need not to be interval, BLR does not require that the independents be unbounded and lastly normally distributed error terms are not assumed.

3.4.2.2 Econometric model -Truncated regression model



Level of market participation is defined here in terms of sales of the principal crop by smallholder farmers. The ratio of gross value of crop sales to gross value of all crop production to total output of crops for each household included in the measure of market participation adopted. The ratio is defined as a household consumption index and is adapted from Randela, Alemu and Gijbewa (2005) (Fort Hare University, 2015). It has been employed such a household commercialisation index to measure market orientation or degree of commercialization in Mpumalanga). According to Randela *et al.* (2008), the calculation of the household commercialisation index can be achieved by employing the following relationship:

$$HCI = \frac{\text{Gross value of crop sales}}{\text{Gross value of all crop production}}$$

The truncated regression model (TR) was used to test the factors that affect the level of market participating of smallholder farmers. The truncated regression model can be used when part of the data is missing. For example, in this case the study is interested in finding the level of market participation of smallholder farmers; this implies that people who are not participating in market are excluded from the sample. Thus the data would be missing for all the persons who are not selling their produce. Thus to find the relationship between level of market participation and the explanatory variables OLS will be appropriate.

The standard truncated regression model is written

$$y = x\beta + u \dots\dots\dots (1)$$

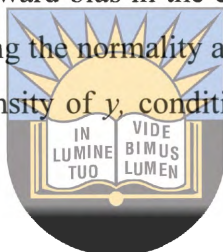
Where: Y denotes household's the volume supplied (level of market participation)

X denotes covariates relevant to the supply decision

β denotes a vector of unknown parameters

u denotes random error.

In the equation (1) the residual u is assumed normally distributed, homoskedastic and uncorrelated with x . Suppose that all observations for which $y_i > c$ are excluded from the sample. Our objective is to estimate the parameter β . It is important not to ignore the truncation as it leads to substantial downward bias in the estimate of β . Fortunately, this bias can be corrected fairly and easily, by using the normality assumption in combination with the information about the threshold. The density of y , conditional on x and y observed, takes a familiar form:



$$f(y|x;\beta, Y = \frac{\phi((y-x\beta)/\sigma)}{\phi(x\beta/\sigma)}, \dots\dots\dots (2)$$

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and the individual log likelihood contribution is:

$$\ln L_i = \ln [\phi ((y_i - x_i\beta)/\sigma)/\sigma] - \ln \phi (x_i\beta/\sigma) \dots\dots\dots (3)$$

The conditional expected value of y is also of a familiar form:

$$E(y|y>0,x) = x\beta + \sigma_u \lambda (x\beta/\sigma_u) \dots\dots\dots (4)$$

The equation (4) above implies that the simple OLS regression of y suffers from the exclusion of the term $\lambda (x\beta/\sigma_u)$. This regression is misspecified and the effect of the misspecification differs across observation, with a heteroskedastic error term whose variance depends on X_i . To deal with these problems, the inverse Mills ratio (IMR) is included as an additional regressor to enable the use of truncated sample to make consistent inferences about subpopulation.

With the justification that the assumption that regression errors in the population are normally distributed, the equation for a truncated sample can be estimated with STATA. Under the assumption of normality, the inferences for the population from truncated regression model

can be made. The regression output that results from the analysis indicate that the values of response variable (in this case, level of market participation) less than specified lower limit are truncated.

Truncated regression model was chosen because is useful in analysing data where the study is interested in finding the level of a particular condition. In other words, truncated regression is used when some part of the data is missing. In this case, the study is interested to discover the factors that influence quantity decisions (level of market participation); this therefore implies that all the data for people who are not participating in markets will be missing.

3.5 Description of the key data variables

The study made use of primary data on smallholder farmers of Ndlambe and Melani village. Interviews with the household heads were conducted to gather primary data. Literature was reviewed to get secondary data. The different categories of data collected are described in the sections that follow. Several independent variables that were used in obtaining the primary and two dependent variables namely participation in market oriented production and level of participation are described in this section. The variables examined in this study are presented in Table 3.1.



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3.5.1 Description of the variables specified in the model

Two dependent variables were considered for the purposes of determining the different factors that influence choice of market participation. These include; market participation and level of market participation.

3.5.1.1 Market participation

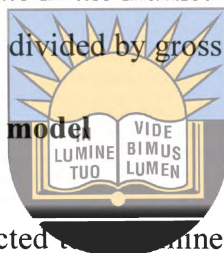
Market participation is used as the dependent variable because the aim of the study focused on transition of farmers from subsistence farming towards market oriented agriculture or entrepreneurial spirit. Jari (2009) indicated that marketing agricultural produce is important amongst smallholder farmers because humans derive benefits such as income and rural employment through it. Marketing activities such as processing, transportation and selling

can provide employment for those willing to exit the farming sector. Marketing also allows for the transition from subsistence farming to commercial farming. Therefore, the study used this variable in order to determine the factors that influence farmers' choice of participation or non-participation.

3.3.1.2 Level of market participation

This variable was used to discover the factors that limit farmers from shifting from smallholder/emerging farmers to commercial farmers. The difference between participation and level of participation is that participation focus on all smallholder farmers while level of participation focus on those who participate in the market but at various levels. This variable was measured by gross value of sold crop divided by gross value of crop production.

3.5.2 Explanatory variables used in the model



Several explanatory variables were collected to determine how they affect farmers' decision on market participation. These include, age of household head, market access, availability of necessary farm implements, marital status, total land under cultivation, type of irrigation used, farm experience, membership on food plot or irrigation schemes, contract with reliable markets, membership on farmers association, reason of production and knowledge on production increase.

- a) AGE: This variable measured the age of the household head. Age is a measure of the farmers work experience since age is, in general, highly correlated with experience. The expectation was that old farmers would have had more time to accumulate both human and financial capital and would thus be in a better financial position to afford effecting improvements (Brown, 2000). Odoemenem and Adebisi (2011) further explained that age is a significant in the achievement of sustainable agriculture for smallholder farmers. The perception is that young people (farmers) are more responsive to new ideas and practices while older ones are conservative and less responsive to the adoption of new ideas and practices. It was further argued that old farmers are less capable of carrying out physical activities compared to young farmers. It is therefore hypothesized that the likelihood of market participation and increases in age move in opposite direction; the more smallholder farmers get older,

the higher the likelihood to participate in market oriented production. Thus a negative sign is expected on this variable.

- b) EDUC: this variable measure farmer's level of education. An individual's level of education can affect his/her access to comprehension and adoption of modern agricultural practices. The low level of education of small scale farmers, especially women who form the immensity of the agricultural labour force has remained a major constraint to the adoption of modern farming techniques and the ability to access other inputs necessary for increased productivity in the sector (Odoemenem & Adebisi 2011). The educational level of a farmer does not only raise his productivity but also increases his ability to understand and evaluate the information on new techniques and the processes of farming better. The perception is that level of education has a great influence on development of farming households. Educated farmers tend to be more progressive than uneducated farmers. It is therefore, expected that a positive relationship exist between level of education and market participation.



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- c) GENDER: This variable measure the gender of the household head. Women play a significant role in the agricultural labour force and in agricultural activities, although to a varying degree. Consequently, their contribution to agricultural output is undoubtedly extremely significant, although difficult to quantify with any accuracy. It has often been claimed that women produce 60-80 percent of food. However, assigning contributions to agricultural outputs by gender is problematic because in most agricultural households both men and women are involved in crop production. It can be attempted to allocate output by gender by assuming that specific crops are grown by women and others by men (Raney et al., 2011). A positive sign is therefore expected from gender.
- d) SOUCAPTA: This variable measures the source of capital for farming. The perception is that farmers who get financial support are able to produce high quality produce which can meet the grades and standard required by the markets. Depending on whether smallholder farmers have a source of capital or not. It was therefore expected that either a positive or negative relationship existed between source of capital and market participation depending on source of capital of an individual.

- e) EMPLOY: This variable measures the employment status of the sampled household head. The perception is that employment status has an influence on the choice of market participation. A farmer's ability to purchase farm inputs may depend on financial situation of the household which is enhanced by non-farm income received. Income received has an effect on crop productivity since the farmer would afford to buy necessary farm inputs. Therefore it can be hypothesized that employment has a positive impact on market participation decision (Baloyi, 2011).
- f) MRKTOUT: This variable measure the accessibility and proximity of market outlet around the area. Access to market may positively influence market participation choice. Therefore it is hypothesized that access to market is positively related to market participation. A study conducted by Gani and Adeoti(2011) indicated that distance to market and had a negative sign, meaning a decrease in distance from the farmers' village to the nearest market will increase chances of market participation.

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Table 3.1: Definition and units of measurements of key data variables

Dependent Variable name	Description of variables	Value
PARTIC	Market participation	Coded 1 if the farmerr participate in the market; 0 otherwise
PARTICLV	Level of market participation	Gross value of crop sales/gross value of crop production
Explanatory variables	Description of variables	Value
MARITAL	Marital status of households head	Coded 1 if the farmer is married; 0 otherwise
AGE	Age of household head	Actual age in years
EDUC	Level of education of household head	Coded 1 if the farmer is educated; 0 otherwise
GENDER	Gender of the household head	A Dummy variable = 1 if the farmer is a male; 0 otherwise
LANDCULT	Total land cultivated	Size of land cultivated in hectares
SOUCAPTA	Source of capital	Coded 1 if the farmer has source of capital; 0 otherwise
EMPLOY	Employment status of household head	A Dummy variable = 1 if the farmer is employed; 0 otherwise
FARMIMP	Access to necessary farm	A Dummy variable = 1 if the farmer has access to necessary farm implements; 0 otherwise
MRKTOUT1	Accessibility of markets	Coded 1 if the farmer has access to markets; 0 otherwise
WAYFARM	Membership on farmers' associations	A Dummy variable = 1 if the farmer is the member; 0 otherwise
FARMEXP	Farming experience	Years of farming experience
RESOPROD	Reason of production	A Dummy variable = 1 if the farmer is selling; 0 otherwise
MEMBERT	Partisanship on irrigation schemes or food	A Dummy variable = 1 if the farmer is a member; 0 otherwise
TYPIRIG	Type of irrigation used	Coded 1 if the farmer is an irrigator; 0 otherwise
KNOLGPRO	Knowledge on production increase	A Dummy variable = 1 if the farmer has knowledge on production increase; 0 otherwise
CONTRFAM	Reliable market for the produce	A Dummy variable = 1 if the farmer have a contract with reliable market ; 0 otherwise
WILLEXPA	Willingness to expand	Coded 1 if the farmer is willing to expand land; 0 otherwise
SUSTPROD	Ability to sustain production	Coded 1 if the farmer has the ability to sustain; 0 otherwise
TRAINOBT	Training obtained	Coded 1 if the farmer has been trained ; 0otherwise
CROPI	Crops grown	Coded 1 if the farmer shifted to cash crops;0 otherwise

Source: Field survey, 2012

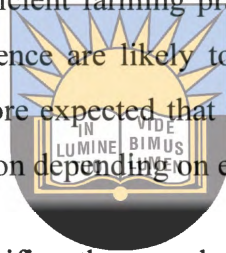
- g) KNGPRO: This variable measures the level of knowledge of farmers. Having knowledge means that a farmer has heard about a new idea and does have detailed information about it. A farmer's ability to acquire new information of increasing productivity either through trainings or learning from experienced farmers has an effect on market participation. It was therefore expected that depending on whether farmer understands the knowledge he has acquired, either a positive or negative relationship existed between knowledge market participation and production increase.
- h) FARMIMP: This variable measures the availability of necessary farm implements. The assumption is that farmers with farm implements are likely to produce more and be able to participate in marketing of their produce. This variable focus on whether the sampled households had access to necessary farm implements. It can therefore be hypothesised that farmers with farm implements are likely to participate in market. A positive sign is expected from the variable FARMIMP.
- i) MARITAL: this variable measures the likelihood of farm participation between single and married farmers. The perception is that married farmers are unlikely to participate in market oriented production since they have to cater for their families first before considering sales of any produce. It is therefore expected for either a positive or negative relationship between marital status and market participation.. Muchara (2011) indicated that marital status of household head is very significant in African societies as it determines stability of families. The belief is that married household heads tend to be more stable in farming activities than unmarried heads, and consequently affect both agricultural production and marketing patterns.
- j) LANDCULT: This variable measures the total size of land under cultivation. This factor influences the decision on market participation since it is aligned with the amount produced. The more the land cultivated increases the higher the likelihood of market participation, vice versa. It is therefore expected for a positive relationship between the size of land cultivated and market participation.
- k) TYPIRR: This variable measures type of irrigation used. Water is a significant resource for agricultural production. Most crops are unable to tolerate drought, meaning that availability of water for any production is crucial. Additionally,



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availability of water is associated with improved output. Irrigation development is expected to increase market participation of irrigators. Riddles *et al.* (2006) stated that introduction of irrigation lead to higher yields, higher cropping intensity and all year round farm production which also leads to increased market-oriented production, implying a shift in supply (marketable surplus production) and perhaps food security. Modern irrigation is also expected to lead to changes in crop mix (cash crop orientation).Therefore it hypothesized that farmers who uses irrigation system are likely to participate in market.

l) FARMEXP: This variable measures the farming experience. Experience is the major determinant of profitability because it allows farmers to adjust to changing economic condition and adopt the most efficient farming practice (Nasiru,Jibril, Sani & Sabo, 2005). Farmers who lack experience are likely to produce low yield and therefore receive less income. It is therefore expected that a positive results between farming experience and market participation depending on experience of respondents.



m) MEMBERT: This variable classifies the membership on food plots or irrigation scheme. As already mentioned above that water availability is essential for crop production. Therefore, it is hypothesised that farmers who have plots in irrigation schemes are likely to participate in market oriented agriculture than those who were producing in home gardens. it can there be hypothesized that, a positive relationship is expected between member and market participation.

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n) CONTRFAM: This variable indicates how important contract farming is. Very few farmers participate in the market and one of the constraining factors is lack of market access. It has been reported that some produce get spoilt because of inaccessibility of markets. It is therefore hypothesised that farmers who have contract with reliable markets are likely to participate in markets.

o) WAYFARM: This variable measures farmers who are members of association or organisation. Ellen and de Pipers (2010) highlighted that Smallholder producers generally do not have access to all factors that are needed for delivering a product that responds to market demand. They often face strong economic, social and physical disadvantages. In some areas infrastructure is poor, while in other areas up-to-date

market information is not always available to everyone. Another challenge is the difficulty in accessing technical advisory services, agricultural inputs and financial services. Therefore, it is very crucial for all smallholder farmers to join association because it provides economies of scale in terms of quantities collected, contacts and negotiations with purchasers, investment in a common operator with adequate skills, the time devoted to marketing tasks, participation in flexible contracts with supermarkets, shops and schools. Another advantage of belonging to a farmer organisation is that it enables the farmer members to have access to training regarding quality improvement. Therefore it is hypothesised that farmers who belong to any association are likely to participate in market oriented agriculture.

p) RESOPROD: This variable indicates purpose of production. Most farmers do not plan before production and instead they produce according to their taste and preferences. This has a negative impact on market participation because they end up not finding markets for the surplus. Every consumer intends to maximise her/his utility in whatever he/she purchases. This clearly states the importance of setting goals of production through assuring that when one decides to supply the market he should produce what is needed by the market. Therefore, it is hypothesized that farmers who plan prior production are likely to participate in market.

q) CROP1: This variable measures the crops grown by farmers of the selected study areas. The assumption is that crop choices differ depending on availability of water sources, farmers who have access to reliable water sources are assumed to produce more cash crops compared to farmers that do not have access. Hagos *et al.* (2008) stated that farmers growing irrigated annuals and irrigated perennials are more likely to participate in the market in contrast to farmers that grew rain-fed annual crop. It is believed that this is because the rain-fed annual crops tend to be mainly food crops.

3.6 Chapter summary

The study was carried out in two villages in Alice and Peddie town, which are situated in the Nkonkobe and Ndlambe local Municipalities respectively, falling under the Eastern Cape Province of South Africa. Farmers were divided into two groups depending on the access to irrigation system. Purposive sampling technique was used to select the two villages, namely

Melani and Ndlambe. The random sampling method was then used to select 64 smallholder farmers in Melani village and other 64 in Ndlambe village in order to come up with 128 farmers. Descriptive statistics were used to profile household characteristics. Data analysis was done using a combination of Microsoft Excel, Statistical Package for Social Scientists (SPSS 18) and STATA 10.



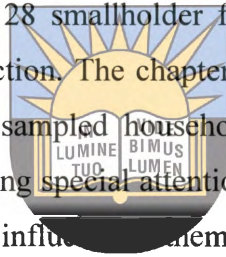
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CHAPTER 4

DESCRIPTIVE RESULTS OF THE STUDY

4.1 Introduction

One of the study objectives was to explore the role of water use patterns in transition from subsistence communal agriculture to smallholder irrigation agriculture in two villages (Ndlambe and Melani) of former Ciskei homeland area of Eastern Cape Province. The specific aim was to evaluate the reasons that are holding smallholders back from moving from subsistence farming as a way of life, towards a more entrepreneurial attitude. To achieve this, data was collected from 128 smallholder farmers who are involved in both irrigated and rain-fed agricultural production. The chapter begins with brief explanations of the demographic characteristics of the sampled households. It goes on to discuss socio-economic aspects of the households, giving special attention to aspects related to agricultural production and marketing and factors influencing them. Within the chapter, descriptive statistics such as mean, maximum and minimum values, frequencies and standard deviation were used.



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4.2 Demographic of sample households

Summary statistics of demographic variables include age, education, household size; gender and marital status are discussed. The summary of the descriptive statistics of the demographic and socio-economic characteristics of the variables used are presented in Table 4.1.

Table 4.1: Demographic and socioeconomic characteristics

	Mean	Std. Deviation	Variance	Skewness
Age	59.21	12.748	162.514	-.375
Marital status	2.14	.791	.626	1.295
Level of education	2.05	.735	.540	.156
Employment status	.10	.303	.092	2.669
Gender	.51	.502	.252	-.032
Farming experience	2.11	1.393	1.941	.902

Source: Field survey data, 2012.



4.2.1 Age of household head

This study examined the relationship between household head and market oriented agriculture. Age of sampled farmers was classified into different groups where each farmer belonged to one group. The range for the sample was from 21 to 90 years of age. The percentage distribution of the sampled household head by age is summarised in Figure 4.1.

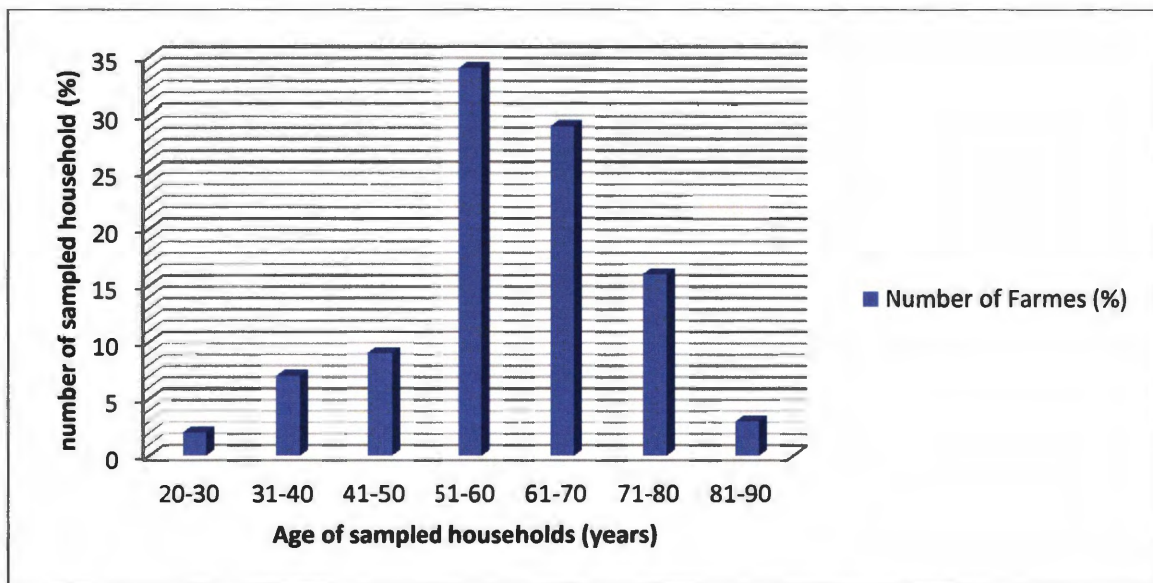


Figure 4.1: Distribution of households by age of the household

Source: Field survey, 2012.

The age distribution of the sampled household head is presented in Figure 4.1. The majority of sampled household head were within the age bracket defined as economically productive in a population (i.e. 20-65 years). The results revealed that 2 % of the sampled household head fell within the age group 20-30, 7% fell within the group 31-40 years, 9% fell within the group of 41-50. The majority (34%) fell within the age group 51-60 years. The sampled household head above 60 years of age constitute only 48% of which 29% is comprised of the 60-70 year olds, 16% of the 71-80 years and 3% made up of the 81-90 year olds. It can be deduced that 67.44% of the sampled household head were between the ages of 31-50 years. This implies that over half of the sampled household head in the study area were in their middle ages.

The respondent pointed out that high rate of migration by young people to look for better jobs was the reason of the findings.



4.2.2 Gender of household heads

Most individuals perceive that males are significantly better in managing farming. This perception is associated with the physical capability of males to cope with manual demand of farming practices. Therefore, the study was interested in finding the gender distribution of farming households. The Figure 4.2 presents the findings of the study.

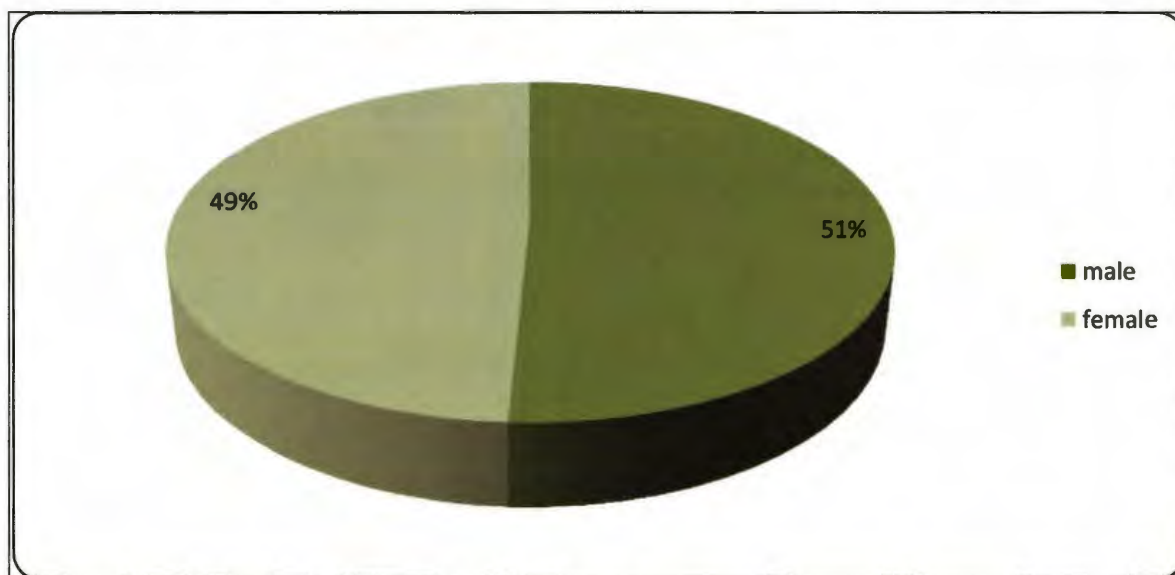


Figure 4.2: Distribution of sample households by gender of the household head
Source: Field survey (2012)

The Figure 4.2 reveals that 51% of the sampled household head were male while 49% were female. This shows that food plots were not only limited to female farmers but to every individual willing to farm hence there was no significance difference in gender distribution of sampled households.

4.2.3 Marital status

The distribution of household by marital status of household head is presented in Figure 4.3.

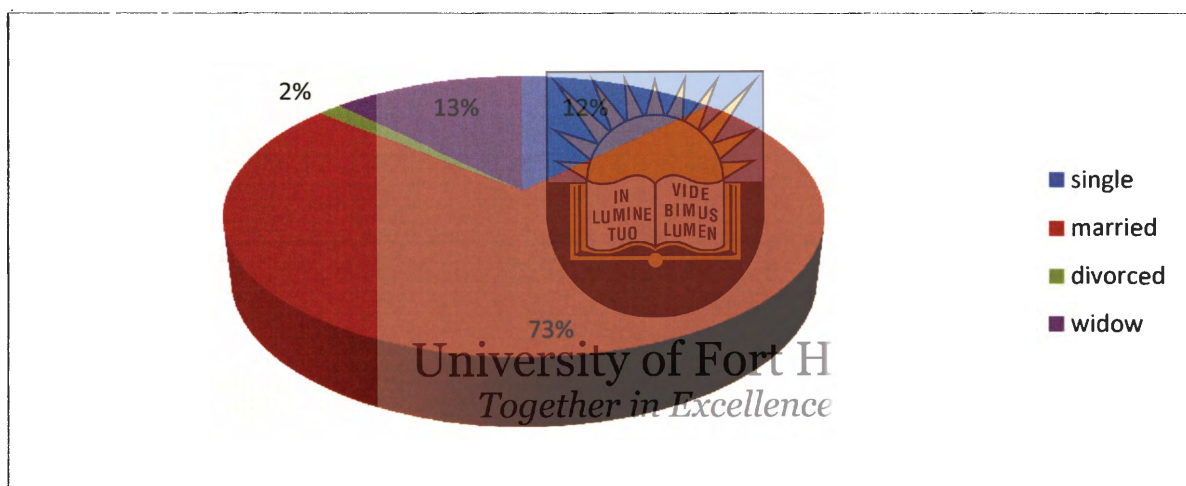


Figure 4.3: Distribution of the households by marital status of the household head
Source: Field survey (2012)

The marital status of the sampled household head (Figure 4.3) was categorised into four groups. The study revealed that 73% of the sampled household head in the study area were married while 13% and 12% were widowed and single respectively. Only 2% of sampled household head were divorced. This shows that most of the sampled household head were family men and women who require family income to cater for their families.

4.2.4 Level of education

Figure 4.4 presents the findings of the study on the educational level of the farming household of both Melani and Ndlambe villages.

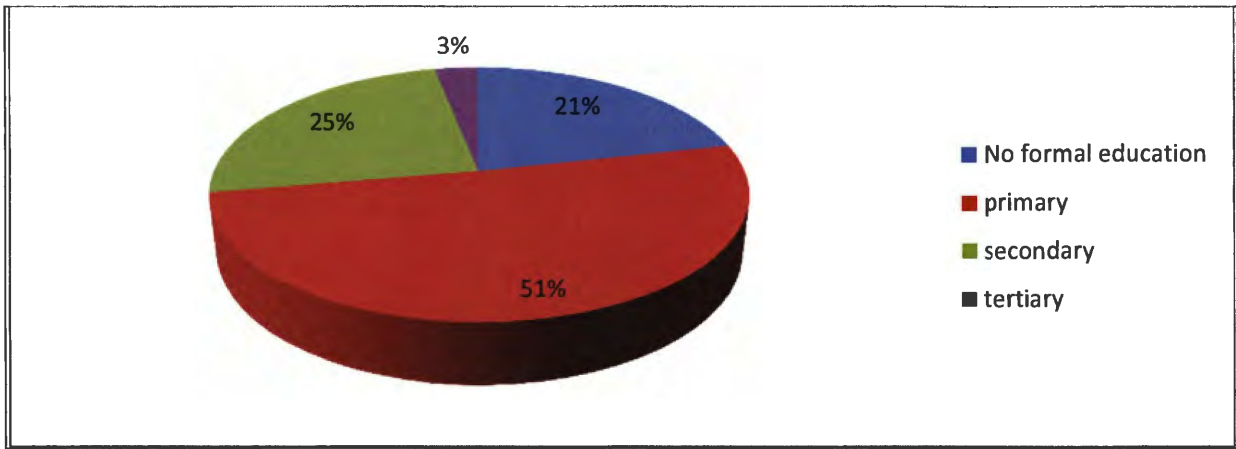



Figure 4.4: Distribution of the household head by level of education

Source: Field survey (2012)

The results in the Figure 4.4 reveal that 51% of the sampled household head had primary education while 25% had secondary education. The figure also illustrate that 21% and 3% had no formal education and had tertiary education, respectively. The result further show that 79% of the sampled household head in the study area had formal education (primary, secondary and Tertiary education). This implies that the literacy level amongst the sampled household head was relatively low.


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4.3 Socio-economic characteristics of households

Information pertaining to socio-economic characteristics of households is cardinal for interpretation of study findings. This section provides the descriptive analysis of eleven variables: employment status of household head, farming experience, membership in farmers association, crops grown by the farmers, market participation, average crop production figures, membership in food plots, type of irrigation used, production challenges faced by farmers and household goals and aspirations in market participation.

4.3.1 Employment status

The study intended to examine farmer's employment status, that is, whether they are employed or unemployed. The results are shown in Table 4.1.

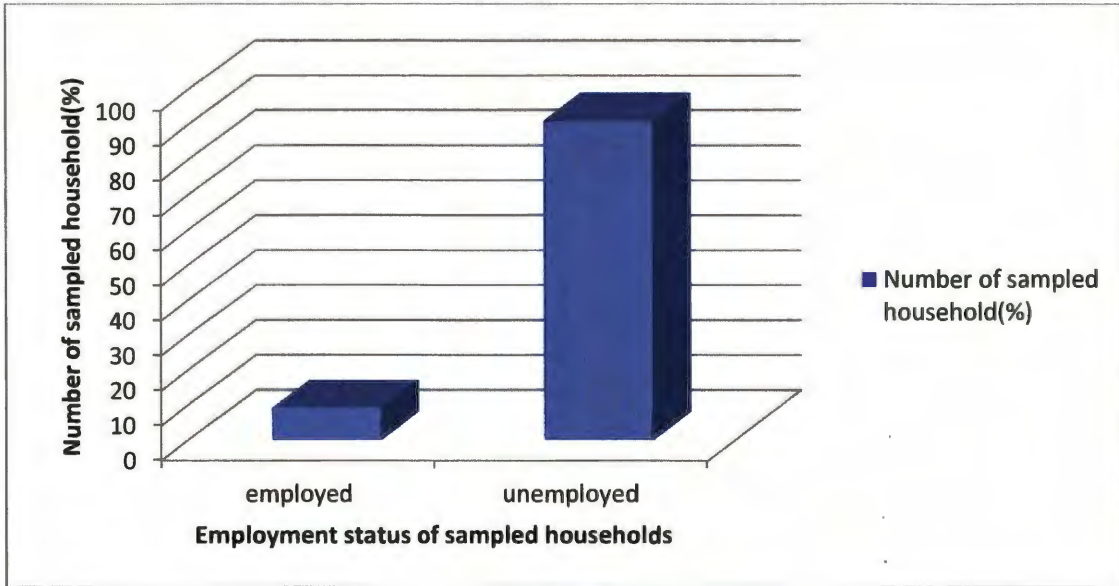
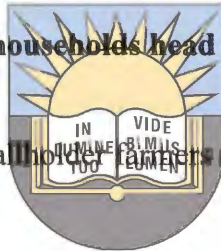


Figure 4.5: Distribution of the sample households head by employment status

Source: Field survey (2012)

The Figure 4.5 illustrates that 91% of smallholder farmers are unemployed while only 9% confirmed to be employed.



4.3.2 Farming experience

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The study intended to discover how much experience the smallholder farmers of these two villages. Figure 4.6 presents the findings on farming experience.

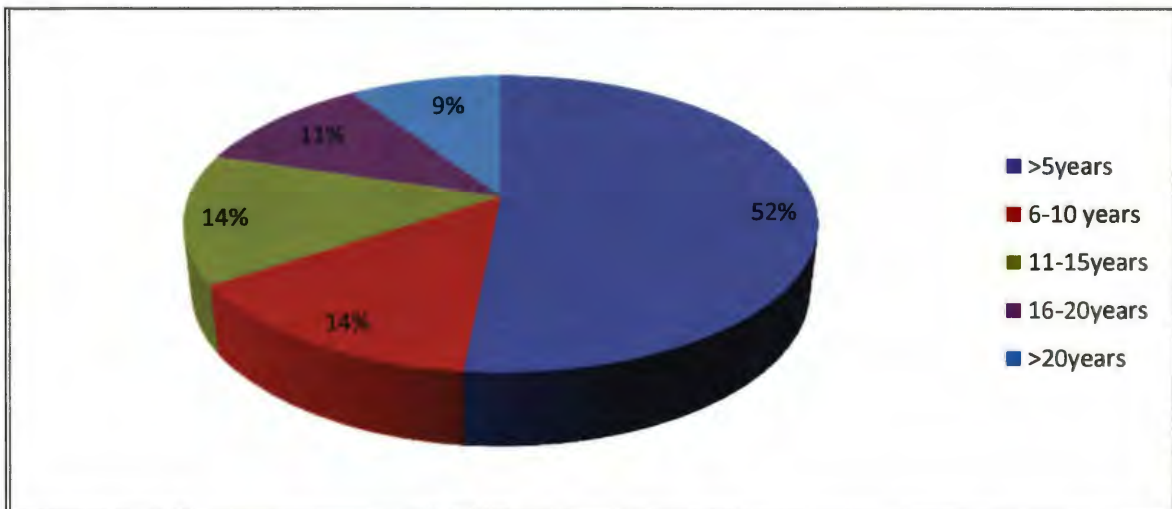


Figure 4.6: Distribution of the sample households head by farming experience

Source: Field survey (2012)

The figure illustrates that the majority (52%) of the sampled household head had 5 years or less of farming experience. Other sampled household head' experience (14%) ranged between 6 to 10 years while 25% had between 11 and 20 years and 9% had more than 20 years. This implies that most of the farmers are less experienced and this might have negative impact on production and marketing of the produce.

4.3.3 Marketing and production factors of sampled households.

The interest of the study was to examine what holds farmers back from shifting towards market oriented production. At such, sampled households were asked about marketing and production factors. The variables that were considered included; farm implements or assets owned, condition of the owned assets, primary and secondary occupation of the household head, land that is not cultivated and reason for not cultivating the land, whether households sell directly from the farm or not and market outlet used by sample households. Table 4.1 present the findings of the study.



Asset ownership has also been found to be important in market participation. Randela, Alemu and Groenewald (2008) support the argument that acquisition and ownership of productive assets can pave the way for a family to participate in economic activities. This implies that household resource endowments have positive effects on the volume of sales. However, inaccessibility of equipment constrains a household's ability to cultivate, its productivity as well as market participation. Rural households that cannot afford the high prices of seeds, fertilizers, fencing and other agricultural equipment usually plant without fertilizers and fencing (Gilimani, 2006). This is also the case in Melani and Ndlambe village. Table 4.1 illustrate that 48.4 percent does not own any farm implements. These farmers depend on neighbours for borrowing production inputs. On the other hand, 16.4 percent confirmed to have only basic implements, that is, hand hoe, hand fork, wheelbarrow and watering can. Thirty three (33) percent of the sampled household head owned less expensive assets while only 1.6 percent owned more expensive assets. These included tractor, motor vehicle, plough *etc.* The study also questioned about the condition of the owned assets. The majority (31%) confirmed that the assets are still in good condition, 14.8 percent assured that the assets were in a fair condition while only 5.5 percent was not happy about the condition as the assets were in bad condition.

Farmers were asked about their primary occupation. Majority declared that farming is what they do every day of their lives. Table 4.1; therefore show that 96.9 percent confirmed that farming is their primary occupation. Very few sampled household head (1.6%) confirmed to have off farm business as primary occupation.

Literature revealed that former homelands are characterized by widespread land abandonment. One of the main reasons for the low utilization of the available agricultural land is the lack of accessibility, inadequate and inefficient use of farm power resources. Table 4.1, therefore provides some evidence of land abandonment. Some sampled household head (20.3%) reported that there is land that is not cultivated in their plots. Among others, they mentioned that lack of capital (14.1%), Lack of skills (1.6%), not interested in farming (0.8%), lack of inputs (1.6%) and not fenced land (0.8%) were the reasons that lead to underutilization of agricultural land.

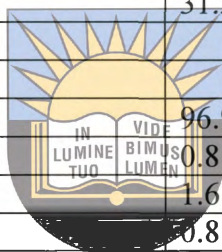


It is important to ensure that smallholder farmers have equitable access to opportunities to compete in the market as this helps to promote the optimal utilization of agricultural resources and also generates income and employment linkages in the market. Despite this fact, rural producers in the Former Ciskei still do not have proper access to formal markets.. According to Table 4.1, 45.5 percent of farmers directly sell from the farm while 22.7 percent does not. Others (32%) were not selling at all. Most farmers (32.8%) are selling at farm gate followed by 20.8 percent who sell to local shops, 1.6 percent to supermarkets and lastly 0.8 percent to neighbours and hawkers.

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Table 4.2: Marketing and production factors of sampled household, Melani and Ndlambe village

Variable	Frequency	Valid percent	Cumulative percent
Farm implements owned			
None	62	48.4	48.4
Only basic implements	21	16.4	64.8
Less expensive implements	43	33.6	98.4
More expensive implements	2	1.6	100
TOTAL N (128)			
Condition of the farm implements			
None	62	48.4	48.4
Bad	7	5.5	53.9
Fair	19	14.8	68.8
Good	40	31.3	100
TOTAL N (128)			
Primary occupation			
Farming	124	96.9	96.9
Civil servant	1	0.8	97.7
Off- farm business	2	1.6	99.2
Other	1	0.8	100
TOTAL N (128)			
Land not cultivated			
Yes	20	15.6	20.3
No	102	79.7	100
TOTAL N (128)			
Reason of uncultivated land			
None	104	81.3	81.3
Lack of capital	18	14.1	95.3
Lack of skills	2	1.6	96.9
Not interested	1	0.8	97.7
Lack of inputs	2	1.6	99.2
Not fenced land	1	0.8	100
TOTAL N (128)			
Directly selling from the farm			
None	41	32.0	32.0
Yes	58	45.3	45.3
No	29	22.7	100
TOTAL N (128)			
Market outlet			
None	56	43.8	43.8
Local	26	20.3	64.1
Supermarkets	2	1.6	65.6
Neighbours	1	0.8	66.4
Hawkers	1	0.8	67.2
Farm gate	42	32.8	100.0



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Source: Field survey data, 2012

4.3.4 Membership on farmers association

Figure 4.7 shows that the majority of the farmers (79%) interviewed did not belong to any farmer association while 21% were members of various farmer associations in the area. Members of such associations received support in the form of cash and subsidies. Educational programmes (symposium and workshops) also formed a major part of the benefits they received from such associations.

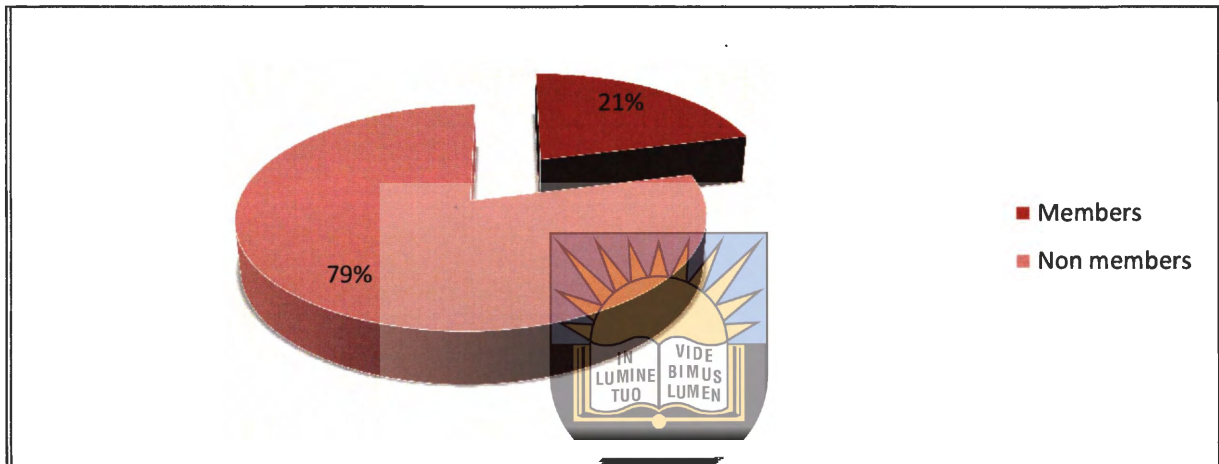


Figure 4.7: Distribution of the sample households head by membership on farmers association

Source: Field survey (2012)

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4.3.5 Crops grown by Melani and Ndlambe farmers

Maize is the most important and widely grown cereal crop, and it is a major part of the diet of both rural and urban communities in South Africa. Maize also provides income to all the commodity value chain agents: farmers' households producing, buyers, processors, exporters and transporters. It is therefore an important crop from both the food security and income generation point of view. Maize meal is eaten as a staple food by the majority of South Africans (Baloyi, 2011). However, the study aimed at investigating crops that are mostly grown in these two villages with the intention of discovering whether these farmers grow more cash crops for marketing purposes or not. The results are illustrated in Figure 4.8.

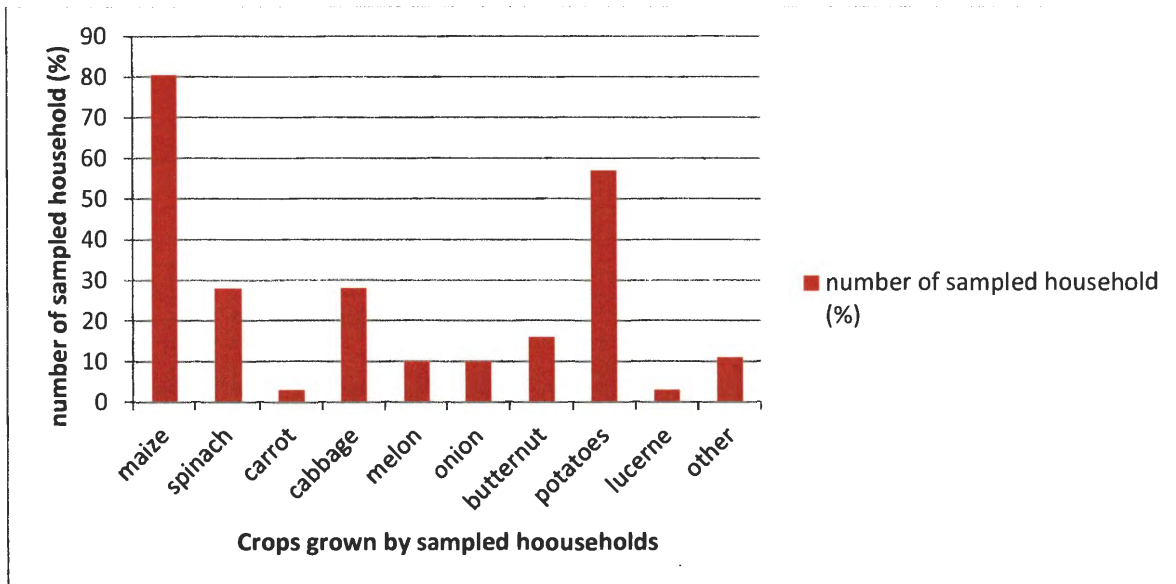


Figure 4.8: Distribution of crops grown by Melani and Ndlambe farmers

Source: Field survey data, 2012.

The figure provides evidence that maize is a widely grown crop. The figure depicts that 80% of the sampled household head grew maize in their home gardens or food plots. The main reason was that it is easy to sell locally than other crops and does not spoil easily. The second mostly grown crop was potatoes (57%). Other crops grown include: spinach (28%), cabbage (28%), butternut (16%), melon (10%), onion (10%), carrot (3%) and Lucerne (3%). These vegetables are a part of most the meals of most people in Eastern Cape Province; especially cabbages. However, these vegetables are grown mainly for both consumption and local market. This implies that these crops are valuable as sources of vitamins and minerals, as well as a source of cash for smallholder farmers.

4.3.6 Market participation

Interviews with sample farmers on market participation indicate that it was common practice for farmers to cultivate their fields on an annual basis. They pointed out that they practice crop rotation or sometimes intercropping due to limited sizes of land. Most farmers confirmed that their main reason of production was to both sell and consume. The study intended to examine whether the quantity sold outweigh the quantity consumed. These results would give clear understanding on market participation level of these farmers. Figure 4.9 presents the findings of the investigation.

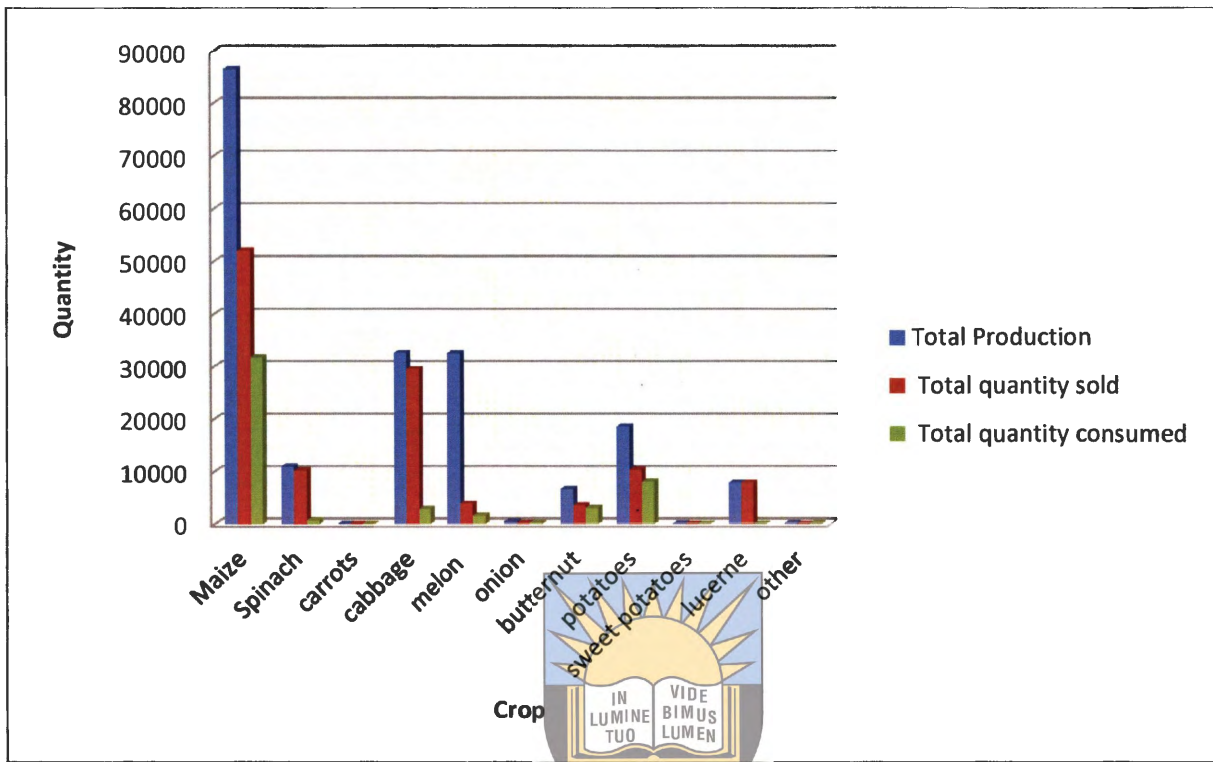


Figure 4.9: Distribution of sample households' market participation
Source: Field survey (2012)

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As indicated in Figure 4.8, maize is the crop that is mostly grown by smallholder farmers of Melani and Ndlambe village. Figure 4.9 provide evidence through illustration of the production per crop, quantity sold and quantity consumed. According to Figure 4.9, maize is the crop with the highest production followed by Melon and Cabbage, Potatoes, Lucerne and Butternut. The Figure 4.9 also indicates that for all the crops grown, quantity sold is higher than quantity consumed. The implication is that even though the majority of the sampled households produce for both sales and consumption; large quantity of the produce is sold

4.3.7 Average crop production figures

The study also identified the influence of enterprise revenue on smallholder agricultural enterprises. The study noted that farmers did not have enough evidence of real price difference between enterprises at the formal market due to the reliance on informal markets for all the crops produced. However, sampled household head confirmed that prices tend to follow seasonal variations that affect demand and supply of the produce. This therefore implies that the crop choice depend on seasonal variation.

Table 4.3: Average crop production figures of the sampled households

Crop	Average yield /annum	Average income/ annum	Average Price/ unit
Maize	86550cob	1299	2.4
Spinach	10948bunch	1616.6	5
Carrot	60 kg	19	5
Cabbage	32624 head	5846	5
Melon	32570 load	2854	10
Onion	535 kg	91.4	5
Butternut	6724 kg	9493.3	8
Potatoes	18600 kg	749.3	6
Sweet potatoes	150 kg	92.5	6
Lucerne	7900 kg	5111.2	3

Source: Field survey (2012)

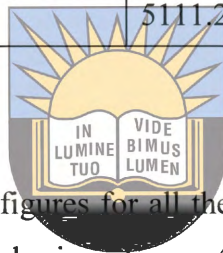


Table 4.2 shows the average production figures for all the crops and vegetables per annum. The prices stated above are year 2012 local prices. Figure 4.8 show that a lot of households in Ndlambe and Melani village produce more maize than any other crop. Although maize is by far the most important item grown and consumed by households, its monetary value, on average per annum (R1299), has been found to be lower than that of butternut (R9493.3), cabbage (R5846), Lucerne(R5111.2),Melon (R2854) and spinach (R1616.6). Maize is followed by potatoes (R749.3), sweet potatoes (R92.5), Onion (R91.4) and Carrot (R19). Butternuts have the highest average income per annum while carrots have the lowest average income per annum. It is believed that the income from vegetables for Ndlambe and Melani smallholder farmers could have been higher if they were using certified seeds, fertilisers, pesticides or herbicides for production. Survey data showed that most farmers do not use any of the above mentioned inputs. Sampled household head also confirmed that some of the produce was lost due to post harvest losses (lack of market).As for maize; it is a non perishable product, which gives the farmers a longer marketing or selling period when compared to perishable vegetables. Furthermore, maize in both villages is sold as either green maize or dry maize.

4.3.8 Membership in food plots and type of irrigation used

The objective of the study was to explore the role of water use patterns in transition from subsistence communal agriculture to smallholder irrigation agriculture and also to determine the aspirations and goals of farmers to expand irrigated crop production from homestead gardens to irrigation plots and/or from one to more than one irrigation plot. Table 4.3 answer the first part of the objective.

Table 4.4: Membership in food plots and type of irrigation used

Membership on food plots	Type of irrigation used					Total
	None	sprinkler	Manual	Furrow	Other	
Member		57	34	7	10	108
Percentages		44.5	26.6	5.47	7.8	84.4
Non-member	1		19			20
Percentages	0.78		14.84			15.6
Total	1	57	53	7	10	128
Total percentages	0.78	44.5	41.44	5.47	7.8	100

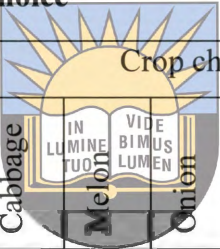
Source: Field survey data, 2012.

The results on Table 4.3 clearly indicate that water use patterns have insignificant impact on transition of smallholder farmers from subsistence communal agriculture to smallholder irrigation agriculture or food plots. It indicates that 84.4 % (108) of total sampled household head are members of food plots using different types of irrigation. Out of 84.4% of membership, 26.6% depend on rain-fed production while 44.5% uses either sprinkler or furrowing. Other sampled household head confirmed that they were using other type of irrigation (7.8%) while 5.47% confirmed that they were using furrow irrigation. Most farmers in Ndlambe had access to irrigation system while most of the farmers from Melani village depended on rainfall for production. On the other hand only 15.6% of sampled household heads confirmed that they practice farming in their home gardens and mainly depend on rain-fed production.

4.3. 9 Type of irrigation and crop choice

Water is a major determinant in crop production. Dingand Peterson (2003) analysed factors affecting crop choices. The studied factors include: output price, water availability, pumping cost, land quality and irrigation development. This analysis focused on water availability or type of irrigation used with the intention of finding out the difference in crop choices between farmers who have access to modern irrigation (sprinkler or furrowing) and those who entirely depend on rainfall for production..The supposition was that farmers who have access to modern irrigation would have a variety of choices than those who depend on rain-fed production irrigation. The results are shown in Table 4.4.

Table 4.5: Type of irrigation and crop choice



Type of irrigation	Crop choice										
	maize	spinach	carrots	Cabbage	Melone	Onion	Butternut	Potatoes	Sweet potatoes	Lucerne	Other
None	0	1	0	1	0	1	1	1	0	0	0
Sprinkler	54	6	2	7	13	5	17	30	4	0	10
Rain-fed(manual)	33	26	3	1	1	8	4	39	0	0	5
Furrow	7	0	0	24	0	0	1	2	0	2	0
Other	9	1	0	3	0	0	0	2	0	3	0
Total	103	34	5	36	14	14	23	74	4	5	15

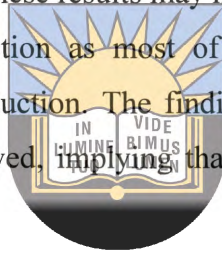
Source: Field survey data, 2012.

The Table 4.4 illustrate that 94.7% of farmers who had access to sprinkler irrigation grow maize, 100% of farmers that used furrow irrigation also grow maize while 97% of the farmers that were using manual water application grow maize. These results indicate that with or without access to irrigation maize is a mostly grown crop by these framers for both consumption and sale purposes. Table 4.4 also depicts that the difference of crop choices between these two farmer groups is very small because every crop that is grown by those who use furrow or sprinkler was also grown by farmers that do not have access to irrigation system.

4.3.10 Production challenges

Production challenges faced by smallholder farmers of Melani and Ndlambe are discussed in this section.

Table 4.5 depicts challenges that smallholder farmers from Ndlambe and Melani villages come across. These include lack of capital, lack of adequate land, lack of relevant training, inability to sustain their production and lack of contract with reliable markets. The results illustrate that 89.8% of sampled household head depend on their personal savings for production (farming) while only 8.6% receive support from government. Two sampled household head (1.6%) declared to depend on other sources of finance which, among others, included remittances and social grants. These results may have a negative correlation with the participation of market-oriented production as most of these farmers cannot afford the required inputs used for marketing production. The findings also confirm that 91% of the sampled household head were unemployed, implying that these farmers mainly depend on social grants, remittances, farming.



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Most farmers in these areas mentioned that the land they are utilising for agricultural purposes is not enough. The majority of sampled household head (74.2%) showed willingness in land expansion if possible while 25.8% were satisfied with the amount of land in use. This also had a negative effect on the market-oriented production decision of smallholder farmers because land is the significant resource in agriculture.

Farmer capacity building can be achieved through, advising farmers on opportunities not only in agricultural production, but in marketing, conservation, and family livelihoods; facilitating, development of local skills, create link with other organization, and related institutions; developing and transferring new technologies to farmers (Kimaro, Mukandiwa & Mario, 2010). However, this factor is not getting any attention in both villages. Farmers of Melani and Ndlambe village rely on indigenous knowledge or their own experience for production. Survey data showed that most farmers do not use any certified seeds, fertilisers, pesticides or herbicides due to lack of knowledge and resources. This compromises farmer's yields and quality, and consequently their participation in markets. The results confirm that 66.4% of the sampled household head have never been trained on any aspect. Only 32.0% confirmed that they acquired training on various aspects. Among others, the trainings included: weaving,

agronomic practises, and crop production as business. The remaining 1.6% did not respond to the question.

For successful business in agriculture sustainability is a very crucial matter to consider. Any agricultural business is associated with risk and uncertainty. Thus, the ability to sustain the farming business is a core matter of any production. However, the results indicate that only 7% of farmers have the ability to sustain their production while 47.7% confirm that with support of associations and government they can sustain their production. 45.3% of sampled household head clearly indicated that they are completely failing to sustain the production. These results reveal that most farmers from these two villages are not yet prepared for commercialization.



It is very good for all smallholder farmers to have reliable markets or to have contracts with a reliable market as they do not have post-harvest facilities. Ngemntu (2010) confirmed that some produce gets spoiled due to lack of market. Many smallholder farmers produce according to their preferences without considering the preference of the customers. As a result, many of them end up selling at lower farm-gate prices. The finding on this matter will be analysed later in this chapter. The findings on Table 4.3 depicts that the proportion of farmers without reliable market stands at 71.9% while only 2.3% confirmed to have reliable markets. The other 25.8% comprises of those farmers that produce for home consumption only

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Table 4.6: The description of the challenges faced by smallholder farmers of Melani and Ndlambe village

Challenges		Frequency	Percent	Cumulative Percent
Source of capital				
Government	1.00	11	8.6	8.6
Personal savings	2.00	115	89.8	98.4
other	4.00	2	1.6	100.0
TOTAL N (128)	Total	128	100.0	
Enough land				
No	1.00	95	74.2	74.2
Yes	2.00	33	25.8	100.0
TOTAL N (128)	Total	128	100.0	
Training acquired				
No response	.00	2	1.6	1.6
Yes	1.00	92	92.0	33.6
No	2.00	85	66.4	100.0
TOTAL N(128)	Total	128	100.0	
Ability to sustain production				
No	1.00	58	45.3	45.3
with support	2.00	61	47.7	93.0
Yes	3.00	9	7	100
TOTAL N=(128)		128	100.0	
Contract with reliable market				
No response	.00	33	25.8	25.8
Yes	1.00	3	2.3	28.1
No	2.00	92	71.9	100.0
TOTAL N=(128)		128	100.0	

Source: Field survey conducted (2012)

4.3.11 Household goals and aspirations of market oriented production

Every farmer in agricultural participation is inspired by his/her goals and aspiration. Table 4.6 gives a summary of farmers' goals and their willingness to expand land under cultivation so as to increase production in their respective crop enterprises.

The results depicted in Table 4.6 show that 41.4% of the products that farmers in both communities produce are for consumption, with 56.3% producing for both marketing and consumption while only 2.3% of the farmers produce specifically for the market. This clearly indicates that crop sale by farmers is not planned prior to production. Therefore, agriculture is not regarded as a cash income generating venture at household level. While 25.8% of the sampled household head were satisfied with their production level and therefore not willing to increase production, an encouraging 74.2% could see the opportunity to increase the scale of crop production. Most villagers mentioned that their current cultivated land is very small (average 0.5 ha) and could not produce enough output.

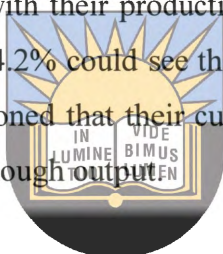


Table 4.7: Summary of farmers' goals and aspirations in market oriented production

Farmers goals in market oriented production	Frequency	Percent	Cumulative Percent
Marketing	3	2.3	2.3
Consumption	53	41.4	43.8
Marketing& consumption	72	56.3	100.0
TOTAL	N=128	100.0	
Farmers aspiration in crop production			
Willing to increase cultivated land	95	74.2	74.2
Not willing to increase cultivated land	33	25.8	100.0
TOTAL	N=128	100.0	

Source: Field survey data, 2012.

Table 4.7 presents the goals of the farmers in crop production in relation to membership to an irrigation project.

Table 4.8: Influence of irrigation project membership on household market participation

Food plots membership	Major production goals			Total
	Marketing	Consumption	Marketing & consumption	
Member	3	40	65	108
Non Members	0	13	7	20
Total	3	53	72	128

Source: Field survey data, 2012.



Table 4.8 depicts that non project members produce mainly for marketing instead the majority produce for consumption only (10%); There were only 7 (5.4%) non-members who at least mix consumption and marketing goals. On the other hand, three (2.3%) members plan their production for marketing only; forty (31.5%) members intend to produce for consumption only and sixty five (50.7%) members mix consumption and marketing goals.


CHAPTER 5

PRESENTATION OF EMPIRICAL RESULTS

5.1 Introduction

The chapter presents the main research findings on variables that affect smallholder farmers' market participation and level of market participation. A cross-tabulation of variable factors that affect farmer's choice of market participation was performed, followed by an econometric assessment of the factors that greatly affect farmers' choice of market participation as well as level of participation.

5.2 Factors affecting farmers' choice of market participation



The farmers' objective of market participation is evaluated against variables such as, farm implements, farm experience, access to markets, inputs for production, membership of the household in any farmers association, membership of the household in one of the irrigation projects or plots in the area as well as other land cultivation. A non-parametric correlation model was used to establish whether there exist some relationships between sets of selected marketing and production variables extracted from the complete dataset presented in Table 3.1. Specifically, the two-tailed Pearson's correlation analysis was computed to indicate the strength and direction of the linear relationships (Tables 5.1) rather than to assess causality. Correlation quantifies the extent to which two quantitative variables, X and Y, go together. When high values of X are associated with high values of Y, a positive correlation exists. When high values of X are associated with low values of Y, a negative correlation exists. The sign of the correlation coefficient determines whether the correlation is positive or negative. The magnitude of the correlation coefficient determines the strength of the correlation.

As has been highlighted in the foregoing chapters, the study aimed to explore the role of water use patterns in transition from subsistence farming to market oriented production. Major contributors to the market participation were assumed and correlation tests were done for all the targeted variables. The variables include: farm experience, source of capital, land cultivated, membership on farmers' association, membership on irrigation scheme or food plots, access to markets and type of irrigation. The results are presented in Table 5.1.

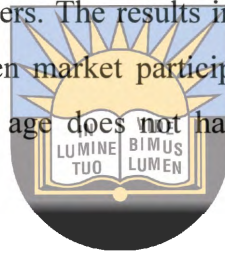
Table 5.1: Pearson's correlation matrix of modelled variables

	GENDER	AGE	MARITAL	EDUC	EMPLO	FARMEXP	LANDCULT	MEMBERT	TYPIRIG	PARTIC	PARTLEVE	MAKTOUT1
GENDER	1											
AGE	.109	1										
MARITAL	.079	.218**	1									
EDUC	-.116	-.439***	-.166*	1								
EMPLO	-.135	-.164*	-.119	.149*	1							
FARMEXP	.095	.210**	.153*	-.043	-.062	1						
LANDCULT	.180**	.003	-.046	.037	-.034	-.031	1					
MEMBERT	.179**	.046	-.023*	-.033	-.069	-.224*	.841**	1				
TYPIRIG	.016	-.120	.024	-.035	-.078	-.428**	.059	.430***	1			
PARTIC	.156*	-.090	.125	-.050	.031	-.100	.132	.192**	.363***	1		
PARTLEVE	.089	-.007	.137	-.051	-.003	-.124	.185**	.140	.263***	.646***	1	
MAKTOUT1	.124	-.045	.174**	-.014	-.022	-.151*	.138	.235***	.426***	.649***	.848***	1

Source: Field Survey (2012) *** significant at 0.01 level (2-tailed); ** stands for significant at the 0.05 alpha level; *stands for significant at the 0.10 level (2-tailed).

Correlation is between household gender market participation. Gender was considered to have a correlation with market participation decision. The perception is that women are responsible for household food security thus they are likely to participate in the market. The survey data indicated that 51% of the sampled household are women. As such correlation coefficient was positive in relation to household decision of market participation ($r = 0.156$) as well as level of market participation ($r = 0.089$) (Table 5.1). This positive correlation implies that the more women are involved in farming the higher the probability of market participation. The correlation is significant between market participation and gender.

The assumption was that age has an influence on farmers' decision regarding market participation. Younger smallholder farmers are expected to be much more likely to participate in the market than older farmers. The results in Table 5.1 indicate that there is a negative correlation ($r = -0.090$), between market participation and age. The correlation is insignificant. These results suggest that age does not have influence farmers' decision of market participation.



The results of correlating responses on marital status and market participation indicate that there is a statistically insignificant correlation between the pattern of responses for these two variables. Table 5.1 clearly indicates that there is a positive and insignificant correlation between households head marital status and market participation ($r = 0.125$). The perception that married households head are likely to produce high quantities and be able to participate in markets was proved to be insignificant.

Correlation is between household level of education and market participation. Household head level of education was considered to have a correlation with market participation decision. The perception is that educated farmers are likely to participate in the market. The survey data indicated that 51% of the sampled household had a primary education. As such correlation coefficient was negative in relation to household decision of market participation ($r = -0.050$) as well as level of market participation ($r = -0.051$) (Table 5.1). This negative correlation implies that with more uneducated smallholder farmers within farming community, the less the chances of market participation.

Correlation is between household head employment status and market participation. Household head employment status is positively correlated ($r = 0.031$) to market participation

while negatively correlated ($r = -0.003$) to level of market participation (Table 5.1). This positive correlation implies that the farmers with other sources of income are more likely to participate in markets compared to those who solely rely on farming for living. On the other hand the negative correlation implies that farmers with other sources of income are less likely to supply more quantities to markets than farmers who do not have other sources of income.

This is the correlation between farmers experience (FAMEXP) and market participation. Farmers experience was considered to have an influence on market participation decision. The assumption was that the more experience the farmer has in farming, the more he/she is likely to adapt to different farming enterprises and thus participates in market. However, survey data indicated that 52% of sampled famers did not have much experience on farming. As such, Pearson's correlation coefficient was negative in relation to households' choice of market participation ($r = -0.120$) as well as level of market participation ($r = -0.124$). However the correlation was statistically insignificant.

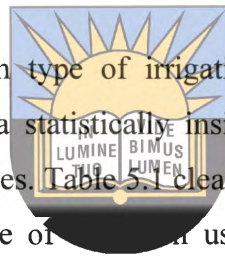


A positive correlation between size of land cultivated (LANDCULT) and market participation was anticipated. Access to arable land is a necessary condition for market participation. Thus it is measured by the size of the arable land the household operates. The larger the size of arable land a household uses, the higher the production levels are likely to be, and the higher the probability of market participation. As expected, the results in Table 5.1 illustrate that the size of land cultivated is positively correlated to both market participation ($r = 0.132$) and level of market participation ($r = 0.185$). However, the correlation is statistically insignificant between market participation and total land under cultivation while significant between level of market participation and total land under cultivation. This implies that size of land cultivated does not have much influence in households' decision of market participation.

Correlation is between household membership in irrigation projects or food plots (MEMBERT) and market participation. Membership in food plots or irrigation schemes is positively correlated ($r = 0.192$) to market participation by farmers, as well as positively correlated ($r = 0.140$) to level of market participation (Table 5.1). This positive correlation implies that the more people are farming in community gardens the higher the probability of

market participation. The correlation is significant between market participation and membership on food plots.

The assumption was that access to market (MRKTOUT) has an influence on farmers' decision regarding market participation. Smallholder farmers with better access to markets, that is, close to larger markets are expected to be much more likely to participate in the market than farmers without access to such infrastructure. The results in Table 5.1 indicate that there is a strong positive correlation ($r = 0.649$), between market participation and access to markets. The correlation is significant at 1 percent alpha level. These results suggest that having access to market is likely to positively influence farmers' decision of market participation.



The results of correlating responses on type of irrigation used (TYPIRIG) and market participation indicate that there is a statistically insignificant correlation between the pattern of responses for these two variables. Table 5.1 clearly indicates that there is a positive and significant correlation between type of irrigation used and market participation ($r = 0.363$). The perception is that as farmers have access to modern irrigation system, they are likely to produce high quantities and be able to participate in markets. As anticipated, the positive and significant correlation suggests that as farmers use the modern irrigation system, they are likely to participate in markets.

5.3 Binomial logistic regression model results

The study aimed at investigating the trends in commercialisation of communal agriculture. For this reason people were asked whether they were participating in marketing of the produce or not. In addition, factors affecting their decision on market participation were examined. Thus, a binomial logistic regression model was fitted to determine the factors influencing the participation of smallholder farmers in market oriented production so as to be able to determine what exactly is holding smallholder farmers from moving from subsistence farming towards a more entrepreneurial attitude. The results are illustrated in Table 5.2.

5.3.1 Implications of the overall factors on market participation

Binary logistic regression was used to determine factors that had a strong influence on market participation. This was performed by combining demographic, socio economic, and production and marketing factors. The dependent variable is market participation (*Logit (MP)*) while the independent variables include all the twenty covariates that were considered for the model. Consequently, all other covariates were eliminated from the equation through the iterative backward variable selection process.

The logistic regression Table 5.2 shows the results for seven variables predicting their effect on market participation decision. If we take an α -level of 0.05, it can be concluded that there is a significant relationship between the response variable and at least three of the predictor variables. By looking at the p-values for each predictor it can be observed that if the α -level is 0.05, only farming experience, willingness to expand production land, reason for production and knowledge on production increase are significant at the 95% confidence level. Therefore, it can also be concluded according to the findings of this research that no significant association between market participation decision and the other explanatory variables in Table 5.1. However none of the slopes is zero meaning that they can be used in the binary logistic equation, in other words there is a relationship between the X and Y variables.

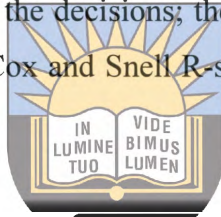
Generally, the coefficient values measure the expected change in the logit for a unit change in each independent variable, holding all other independent variables constant. The sign of the coefficient indicates the direction of influence. A positive value indicates an increase in the likelihood that a farmer will change to the alternative option, that is, market participation. On the other hand, a negative value shows that it is less likely that a farmer will consider the market participation. Therefore, in this study, a positive value implies an increase in the likelihood of market participation. Coefficients close to zero indicate that an association between the predictor and binary response may not be important. Odds ratio is used to interpret the effect of predictor variables on the binary response. Odds ration corresponds to a one unit change in the variable. The initial binary regression model is as follows:

$$\text{Logit (P}_i) = (P_i/P_i) = \beta_0 + \beta_1 \text{ EDUC} + \beta_2 \text{ WAYFARM} + \beta_3 \text{ MEMBERT} + \beta_4 \text{ MARKTOUT1} + \beta_5 \text{ TYPIRIG} + \beta_6 \text{ CROP1} + \beta_7 \text{ SUSTPROD} + E_t$$

After removing insignificant variables access to market (MARKTOUT1), type of irrigation used (TYPIRIG) and ability to sustain production (SUSTPROD) remain as the main factors that have an impact on the binary response, therefore the final binary logistic regression model is as follows:

$$\text{Logit (market participation)} = -3.664 + 4.046\text{MARKTOUT1} + 1.398\text{TYPIRIG} + 3.601\text{SUSTPROD} + 1.117$$

The logistic regression of the market participation on a set of explanatory variables correctly predicted more than 57% of the observed variation in comparing participants and non-participants. Under Model Summary the -2 Log Likelihood statistics is 83.188. This statistic shows how strongly the model predicted the decisions; the smaller the statistic the better the model. Both Nagelkerke R-square, and Cox and Snell R-square values are lies between zero and one



Goodness-of-fit statistics assess the fit of a model against actual outcomes. The inferential goodness-of-fit test is the Hosmer and Lemeshow (H-L) test that yielded a χ^2 (8) of 8.228 and was insignificant ($p > 0.05$), suggesting that the model was fit to the data well. In other words, a non-significant Hosmer and Lemeshow chi-square statistic indicated that a model had adequate fit. Table 5.2 summaries the econometric results of the binary regression model.

Table 5.2: Binary logistic regression results on market participation choice

Variables	Coefficient	Standard error	Wald	Significance (P-Value)	Odds Ratio	95.0% C.I. for odds ratio	
						Lower	Upper
Level of education (EDUC)	-.672	.653	1.059	.303	.511	.142	1.836
Membership on farmers association (WAYFARM)	-.672	.750	.804	.370	.510	.117	2.219
Membership on irrigation scheme (MEMBERT)	-.351	.872	.162	.687	.704	.127	3.885
Access to Markets (MAKTOUT1)	4.046	.869	21.667	.000***	57.179	10.407	314.153
Type of irrigation used (TYPIRIG)	1.398	.766	3.332	.068*	4.046	.902	18.150
Crops grown (CROP1)	-1.116	.741	2.139	.145	.338	.076	1.418
Ability to sustain production (SUSTPRD)	3.601	.918	15.392	.000***	36.652	6.063	221.558
Constant	-3.664	1.117	10.760	.001	.026		
Overall prediction		57.03					
Participants		57.03%					
Non participants		42.9%					
-2Log likelihood		83.188					
Cox & Snell R Square		.512					
Nagelkerke R Square		.687					
Hosmer and Lemeshow Test (8)		8.228	(P=0.313)				

***1% significant; **5% significant; and *10% significant

Source: Field survey (2012)

Table 5.2 illustrates the results of the binary regression model. According to Table 5.2 access to market, type of irrigation used and ability to sustain production are the factors that shown

to influence market participation. All other variables were found to have insignificant influence on household decision of market participation.

5.2.1.1 Level of education of the sampled household head

Higher level of education could potentially enhance market participation, either through acquisition of the knowledge relevant to market participation or the efficient use of available resources. Level of education of household head is expected to have an effect on farm resource use and the ability to adopt new technology which would eventually increase yield. With increased yield farmers would be able to participate in market. (Baloyi, 2011) The perception is that literate have skills to acquire relevant information and have ability to analyse the information. Based on the literature reviewed, level of education was considered to have an influence of market participation. The analysis reveals a negative and insignificant relationship between level of education and market participation. The negative coefficient signifies that the majority of the sampled household are not educated. The possible explanation for this relationship is that an individual's level of education has an effect on his/her access to knowledge and adoption of modern agricultural practices. This therefore implies that farmers with low levels of education are less likely to participate in market.



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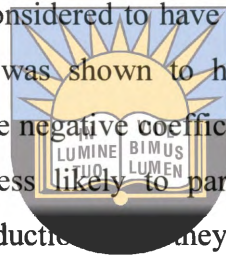
5.2.1.2 Membership to farmers association

Farmers who belong to farmers association may have different probabilities to participate in market. Previous studies stated that farmers association assists farmers with the contacts and negotiations with possible buyers. The additional advantage of belonging to farmers association is that it enables the smallholder farmers to have access to training regarding quality improvement (Ellen & de Piters, 2010). Based on previous studies the perception was that farmers who belong to farmers association were likely to participate in markets. Surprisingly, WAYFARM was shown to have a negative and insignificant relationship ($p = .370$) with market participation. The results are contrary to the statement that 'farmers have shown appreciation of the services they receive from association. Farmers confirmed that these activities are motivating factors to commercialise their production' (Matita & Chirwa, 2012). The possible explanation for the results is that the majority of sampled households showed no interest in joining the association. Their belief is that working independently is more efficient than working in a group. They indicated that some of the conflicts that arise

within a group are time consuming and affect the productivity negatively. Thus the majority of sampled household was not belonging to any farmers association.

5.2.1.3 Membership on irrigation scheme

Previous studies indicated that irrigation schemes have not performed well in terms of yields and economic returns. This implies that smallholder farmers have failed to produce higher yields to match food demands. Increased productivity through introduction of irrigation scheme is necessary since the possibility for increasing production by increasing the area under cultivation is limited (Machethe, Mollel, Ayisi, Mashatola, Anim & Vanasche, 2004). On the basis of the literature reviewed that irrigation scheme have performed poorly, Membership on irrigation scheme was considered to have influence on market participation. Surprisingly, the variable MEMBERT was shown to have a negative and insignificant association with market participation. The negative coefficient suggests that farmers who are working under irrigation scheme are less likely to participate in market. The possible explanation for this is limited size production that they have access to. Majority of the sampled households confirmed that the size of plots did not exceed 0.25 hectares.



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5.2.1.4 Type of irrigation used

Water is a significant resource for agricultural production. The perception is that availability of water would lead to improved yield which eventually would result to market participation. Previous studies report that development of small-scale irrigation scheme lead to higher yields, higher cropping intensity and all year round production which will result to increased market-oriented production (Riddles et al., 2006). Based on literature, it was expected that type of irrigation would have a positive influence in market participation. As anticipated, type of irrigation used was shown to have a positive and significant ($p= 0.068$) association with market participation. This suggests that type of irrigation used is one the chief driver amongst the attributes of technology to result in higher market participation. These results are different with the findings of the study conducted in Ethiopia by Hagos *et al.*, (2008) that farmers working under the traditional irrigation are found to have no significant difference in participating in output markets. These results suggest that intervention of government through rehabilitation of small-scale irrigation scheme show to have positive impact on market participation of smallholder farmers. Introduction of irrigation assist farmers to overcome

constraints of droughts or shortage of water while also allow farmers to diversify cropping into more cash crops as well as increased cropping intensity which would enable them to participate in market.

5.2.1.5 Crops grown by sampled household head

Crop choice was also considered to have an influence on households' market participation decision. Economic and Social Research Foundation, (ESRF) (2010) declared that the potential to participate in markets lies in the fact that crop production shifts resources from low value crops to high value ones, and hence increases the likelihood of the high returns from production. However, the data survey indicated that over 80% of sampled household head still produce maize of which its monetary value is less than that of some vegetables. Expectedly, crops grown (CROPI) variable revealed a negative and insignificant ($p= 0.138$) relationship with the probability of market participation by farmers. The negative coefficient suggests that farmers who haven't shifted from traditional crops to cash crops/high value crops are less likely to participate in markets. Research findings further revealed that small-scale farmers who produce vegetables ~~is not more. This implies~~ that the majority of sampled smallholder farmers have not yet shifted to high value crops. It is therefore important to encourage small-scale producers to consider fresh vegetables production as it can increase their likelihood of market participation and enhance their incomes.

5.2.1.6 Access to markets

Access to markets for smallholder farmers is crucial for exploiting the potential of crop production to contribute to increasing cash incomes of rural households engaged in farming systems. However, the majority of smallholder farmers are located in remote areas with limited access to market. Due to poor access roads and high transportation costs, smallholder farmers are forced to sell their produce at farm gate (collectors/assemblers), local shops as well as to neighbours. On the basis of past experience, access to market was considered to have an influence on market participation. The analysis revealed a positive and significant relationship between access to market and market participation. The variable proved to be significant at 1 percent alpha level. According to odds ratios, access to markets has 57.179 chances larger of influencing household decision of market participation. The possible

explanation is that with good market access, smallholders tend to divert very little of their produce to home consumption. This implies with good access market, smallholder farmers are encouraged to produce mainly for sales and profit maximisation becomes the priority. The implication is that access to market result to increased market participation.

5.2.1.7 Ability to sustain production

The majority of smallholder farmers fail to sustain their production. Previous studies report that consumers always complain about poor quality of products produced by smallholder farmers. In some cases insufficient supply is also a significant complaint (ESRF, 2010). Sampled household head pointed out that factors that lead to fluctuation of production in small-scale farming include lack of sufficient inputs, lack of market and production information, theft as well as drought conditions where there is no irrigation system. Based on previous studies ability to sustain production (SUSTPROD) was considered to have influence on market participation. SUSTPROD was shown to have a positive and significant at 10 percent alpha level ($p=0.000$). This suggests that smallholder farmers with sustainable production are likely to participate in the markets compared to those who fail to sustain their production. Sustainability is very crucial in agricultural business because it give comfort to customers. Ability to sustain production also assists farmers to create good relationship with customers and in turn customers would develop to trust the supplier. Eventually, more customers would be attracted and thus result to improved market participation. In addition, the fact that smallholder farmers are unable to meet the buyers' specification and demand indicates a huge potential to increase production of required produce to meet this demand.

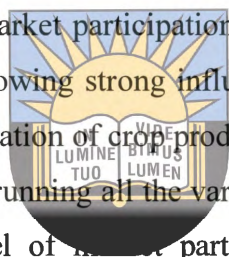
5.4 Truncated regression model

The study further investigated the factors that affect household's quantity decision (level of market participation). As has already been mentioned in the methodological chapter, a truncated regression model was fitted to determine the factors influencing the quantity decision of those households that have decided to participate in marketing of the produce. The farmers' quantity decision was evaluated against the following variables: gender, age, marital status, employment status, source of capital, crops grown, willingness to expand production land, access to necessary farm implements, farming experience, access to markets,

contract farming, ability to sustain production, knowledge on production, reasons for production, membership of the household in any farmers association, membership of the household in one of the irrigation projects or plots in the area as well as total land cultivated. The truncated regression was run on STATA and the output showed that all but 58 observations were truncated, with 2 variables being statistically significant at 5 and 1 percent alpha level. The significant variables were: access to markets and membership on irrigation scheme or community garden.

5.4.1 Implication of the overall factors on level of market participation

As indicated in the previous section, a truncated regression was run to determine factors that had a strong influence on the level of market participation, and resulted in the truncation of all but 70 observations and 2 factors showing strong influence on the quantity decisions of households participating in commercialization of crop production within irrigation systems of the project area. This was performed by running all the variables that were considered for the model. The dependent variable is level of market participation (sales index) while the independent variables include all the basic mentioned covariates. These variables were selected on the basis of previous research on market participation. Previous researchers considered these variables as some of the variables that enhance or influence market participation, among others. Therefore, the study intended to probe the effect of these factors on market participation within the study area. Table 5.3 summarizes the results of the truncated regression of factors affecting market participation level.



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Table 5.3: Truncated regression results of market participation level

Variables	Coefficient	Standard error	Z-Value	P-value	95 % confidence interval	
Farming experience	.0593428	.0578304	1.03	0.305	-.0540027	.1726882
Source of capital	-.0850788	.0854976	-1.00	0.320	-.252651	.0824934
Membership on irrigation scheme	-.2158865	.1141262	-1.89	0.059	-.4395698	.0077968
Crops grown	.1078589	.1038239	1.04	0.299	-.0956321	.31135
Access to Market	.7274231	.0793906	9.16	0.000	.5718205	.8830257
Ability to sustain production	.0493991	.0654855	0.75	0.451	-.0789502	.1777483
Training obtain	.0772713	.0600212	1.29	0.198	-.0403681	.1949107
_cons	.0538074	.1179072	0.46	0.648	-.1772865	.284913
Number of observation	70					
Wald chi2(7)	102.06					
Log likelihood	23.500113					
Prob>chi2	0.0000					
Number of truncated observations	58					
***significant at 1% level						
** significant at 5% level						
*significant at 10% level						

Source: field survey (2012)

Table 5.3 illustrate that the most important determinants of volume decisions (measured by the value of sale) are membership in irrigation scheme as well as access to markets. All other variables were found to have insignificant influence on level of market participation.

5.2.2.1 Farming experience

Farming experience is considered as one of the important factors in market participation. Previous studies indicated that it assist to capture aspects relating to networks and links with market players which accrue over time. However, ESRF (2010) argued that age is likely to positively affect profitability, with more experience contributing to increase in expertise in farming. This implies that as a farmer ages, profitability would increase only at a decreasing rate. However, the survey findings indicated that majority of the sampled households have an experience of less than five years. The implication is that these farmers are still learning different farming systems in order to be well equipped for producing large quantities that would enable them to increase the quantity supplied to markets. FARMEXP appeared to have positive and insignificant relationship with level of market participation. Due to changing environment the interest is shifting from farming to industrial jobs. There has been abandonment of land in rural areas due to urbanization. The implication is that experienced farmers are diverting from farming to other occupation. However, the farming industry has not stopped operating; the interest in farming is increasing in others.



5.2.2.2 Source of Capital

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One of the study objectives is to explore the potential opportunities and challenges to commercialization of subsistence agriculture in the communal areas. The data survey findings show that 89.8% of the sampled households depend on personal savings for production. Capital is one of the major constraints in development of these farmers. Previous studies indicated that capital is very important in agricultural production because of the various inputs needed. In addition, agricultural production is labour intensive which can be achieved through hired labour or tractor. Source of capital was considered to have an influence on level of market participation. The analysis revealed a negative and insignificant relationship between source of capital and level of market participation. The possible explanation for this lies in the fact that the majority of the sampled household depend on personal savings. Lack of capital signifies that these farmers fail to produce large quantity to match market demands.

5.2.2.3 Membership of household head to irrigation scheme

Findings of previous researches revealed that membership on community garden (MEMBERT) or having a plot on irrigation scheme have a negative relationship with market participation. For this reason, the study considered MEMBERT as one of the factors that influence market participation. Van Averbeke *et al* (2011) indicated that distribution of plot size among plot-holders on smallholder irrigation schemes was a limiting factor for market participation because many plots in irrigation schemes do not exceed 0.5 ha. Thus they are regarded as food plots, because farming on these small plots was shown to serve primarily as a source of food for plot-holder households. The analysis revealed a negative and significant relationship ($p=0.059$) between having a plot on irrigation scheme or community gardens (MEMBERT) and market participation. These results support the literature that plot size is a limiting factor among plot holders of community gardens. One of the suggestions to overcome the issue of land is to merge the plots into one big plot that would allow farmers to produce marketable surplus. By doing so, a cooperative will be formed thus enable them to even access funds from government as cooperative.



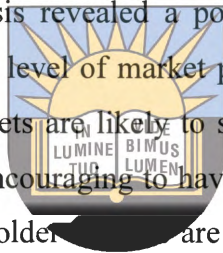
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5.2.2.4 Crops grown

One of the study objectives was to understand the impact of small-scale irrigation scheme on commercialisation. The perception was that developed small-scale irrigation system would expand crop choices and encourage a shift from traditional crops to cash crops. Previous studies indicated that an increase level of market participation requires encouraged farmers to produce over and above their own needs and use the land and labour for high value crops that can be easily be sold in the markets. This therefore implies that, rural households need to diversify their production and invest in additional enterprises specifically for market-oriented produce (Rahut *et al.*, 2010). For this reason, crops grown were considered to have an influence on level of market participation. Crops was shown to have a positive and insignificant relationship with level of market participation ($p=0.299$). Survey data revealed that there was no significant difference in crop choices of smallholder farmers operating under irrigation scheme and those operating under manual irrigation. This clearly indicates that farmers do not know the advantages of having a reliable water source.

5.2.2.5 Access to markets

Previous studies highlighted that smallholder farmers still face difficulties with regards to market access. The majority of sampled household indicated that they did not have access to formal markets. The International Fund for Agricultural Development (IFAD) (2013) reported that Smallholder farmers do not compete equally with local, regional or global markets. Often they lack access to markets because of poor roads and in most cases transportation costs are too high. For these reasons, smallholder farmers are forced to sell their produce at farm gates or locally. As a result they always fail to notice higher food prices since these prices do not always filter down to the farm-gate, Based on the literature, the variable (MRKTOUT1) was considered to have an influence on level of market participation. As anticipated, the analysis revealed a positive and significant relationship ($p=0.000$) between access to market and level of market participation. These results suggest that farmers with access to formal markets are likely to supply more quantities to markets. Sampled household indicated that it is encouraging to have access to market since it reduces chances of spoilt produce. Many smallholder farmers are always complaining about market access as one of the major constraint that discourages them. Improvement of formal market access either through development of infrastructure (access road) or subsidies in transportation cost would enhance quantity decisions of farming community.



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5.2.2.6 Ability to sustain production

On the basis of past experiences on ability of smallholder farmers to sustain production, it was expected that the study would reveal a positive relationship between ability to sustain production (SUSTPROD) and level of market participation. Unexpectedly, SUSTPROD was shown have a positive and insignificant relationship with the level of market participation ($p=0.451$). The results suggest that even if farmers are able to sustain production, their level of market participation will not improve. The possible explanation is that majority of most smallholder farmers in rural areas engage concurrently in the production and consumption of the produce. The data survey found that 56.3% of the household were producing for both consumption and marketing. However, the sampled household that selling was not the priority but only considered if there is marketable surplus. This therefore implies that the priority of most households is to secure food first for their families and sell later when there

is marketable surplus. Hence the variable appears to have insignificant influence on the binary response (quantity decision of sampled household).

5.2.2.7 Training obtained by sampled household

One of the objectives of the study is to explore the potential opportunities and challenges to commercialization of subsistence agriculture in the communal areas. Farmer training is considered as one of the opportunities that can develop farmers towards market-oriented production. Previous studies indicated that production and marketing training is always desirable to farmers as they are often eager to improve their knowledge and practices. Market participation requires that farmers should receive some training on issues pertaining quality of the produce as well as marketing channels (Ampaire & Rothschild, 2010). Training obtained was shown to have a positive and insignificant relationship with level of market participation ($p=0.198$). These surprising results may be aligned to the fact that many households are engaged in farming as well as participating in market though at low levels without being trained before. Many of sampled households depend on indigenous knowledge while new farmers get help from experienced farmers through learning their farming skills.

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5.5 Factors that influence smallholder farmer's decision of market participation and their interpretations

Table 5.6 show the summary of the factors that are influencing the market participation decision of smallholder farmers. The p-value and the null and alternative hypothesis were considered for finalising if a predictor variable has an influence or not. For example, if a null hypothesis ($H_0: \beta = 0$) cannot be rejected, it means that the coefficient of the predictor variable is equal to zero therefore resulting in the predictor variable having a zero effect on the response variable. In other words, the p-value of the predictor variable will be higher than that of the α -level, which in this case is at 95% confidence level. Therefore all the variables in Table 5.6 whose p-value is greater than the α -level ($\alpha = 0.05$) at 95% confidence level can safely be removed from the binary regression model as they do not have a significant influence on the binary response variable (market participation). This therefore implies that these factors are not influencing the market participation decision of Melani and Ndlambe smallholder farmers. Factors with much influence are those variables whose p-value $< \alpha$ -level

($\alpha = 0.05$), thus in that case the null hypothesis ($H_0: \beta = 0$) is rejected and the alternative hypothesis ($H_1: \beta \neq 0$) is accepted.

Table 5.4: Factors influencing market participation obtained from Ndlambe and Melani village

	Predictor Variable	P-Value	Coefficient	$H_0: \beta = 0$ $H_1: \beta \neq 0$
1	MRKTOUT1	0.000	4.046	Rejected
2	TYPIRIG	0.068	1.398	Rejected at 90%
3	SUSTPROD	0.000	3.601	Rejected

Source: Field survey (2012)

According to Table 5.4, access to market, type of irrigation used as well as ability to sustain production are the predictor variables with the lowest P-values while also having a high influence on the response variable. Therefore, it can be concluded that these variables are strong factors influencing farmer's market participation decision in Melani and Ndlambe according to their P-values. Type of irrigation used is the only predictor variable whose null hypothesis was rejected at 90% confidence interval. This means that at 95% confidence interval it does not have significant influence.

Table 5. 5 : Factors influencing level of market participation obtained from Ndlambe and Melani village

	Predictor variable	P-value	Coefficient	$H_0=0$ $H_0 \neq 0$
1	MRKOUT1	0.000	0.1078589	Rejected
2	MEMBERT	0.059	-2.158865	Rejected at 90%

Source: Field survey (2012)

According to Table 5.5 Access to market is the predictor variable with the lowest P-value and have a high influence on the response variable. It can therefore be concluded that access to market is a strong factor influencing quantity decision of sampled household. Membership on irrigation scheme was rejected at 90% confidence interval. This means that at 95% confidence interval, membership on irrigation scheme does not have significant influence.

5.6 Chapter Summary

This chapter provided empirical evidence of perceptions factors influencing market participation choices among smallholder and emerging farmers in Alice and Peddie. These perceptions influencing market participation decision were defined and tested using the binomial logistic regression model. The model was used to analyse factors that influence market participation. The test which included all twenty variables that were specified for the model was run. The results of the logistic regression model revealed that the market participation choices of the sampled smallholders are greatly influenced by access to markets. Type of irrigation used was found to influence binary response significantly at 10% alpha level. This clearly indicates that the market participation choices of the sampled smallholders are not influenced by type of irrigation used. These results show that participation *per se* is not influenced by whether the household works under irrigation system or not. The statistically significant variables, at the 5% level were access to markets as well as ability to sustain production.



On the other hand, a different model was used to model quantity decisions of the household that have decided to participate in market (level of market participation). The truncated regression model was used to test the factors that affect the level of market participation of smallholder farmers. It was chosen because the interest of the study was to focus only on those individuals who decided to participate in market. This implies that the data were truncated, hence the model was used. The results of the truncated model illustrate that quantity decision of the sampled household is significantly influenced by access to markets. These results clearly indicate that development of small-scale irrigation does not have any effect on level of market participation. The statistically significant variable, at 1% level is access to markets while membership on irrigation scheme was significant at 10 percent significance level. One test was run for level of market participation and the following predictor variables found to be influencing the binary response (level of market participation):, farm experience, secondary occupation, gender, reason for production, training obtained by sampled households and access to markets.

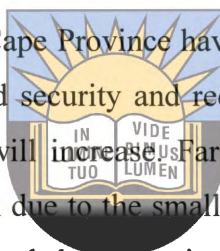
CHAPTER 6

SUMMARY, CONCLUSION AND RECOMMENDATIONS

6.1 Introduction

The dissertation broadly covered the issues around commercialisation with a main focus on the level of market participation of smallholder farmers. An attempt was made to review relevant material on the subject matter and apply the findings within the smallholder context in Eastern Cape Province of South Africa. A background profiling of smallholder farmers was done as a means of identifying their major goals in agriculture production and marketing.

The smallholder farmers in the Eastern Cape Province have potential to contribute to growth in the rural areas, alleviate poverty, food security and reduce income inequality. Therefore their contribution to economic growth will increase. Farmers have not yet reaped the full potential benefits of the irrigation system due to the small scale of production and hence did not fully participate in market. It is argued that there is need for these farmers to increase market participation and venture into commercial farming, if they are to contribute to the economic growth. However, it has observed that smallholder farmers are restricted by a number of institutional arrangements, technical factors and perceptions, making it difficult for them to commercialize.



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This chapter therefore gives the summary and conclusions arrived at based on the findings of the study. Finally, the chapter puts forward some recommendations which are believed to be of future benefit to improve smallholder farmers' participation in markets and thus commercialization.

6.2 Summary

All the chapters that were included in the study are summarized in this section, which include the literature review, the methodology and the study results.

6.2.1 Introduction and background of the study

Eastern Cape is one of the poorest provinces in South Africa, with 70.7% of its 6.2 million inhabitants classified as poor. Eastern Cape is, by most indicators, the province with the highest incidence of poverty in South Africa. It has the lowest mean monthly household expenditure, and 48% of the population are classified as living in poverty. This may be caused by the current reality of agriculture in the former homelands of South Africa which is characterized by widespread abandonment of land due to increased urbanisation. This result in the smallholder agriculture not fulfilling the pivotal role it should be playing in rural areas and the country at large. It is observed that while in some areas there is a shift in cultivation practices with declining use of arable plots in favour of home food gardens, in other areas it has been confirmed that there is a “virtual collapse of agriculture” which result in a subsequent dependence of rural people on non-agricultural incomes, which include wages, social pensions, and remittances.



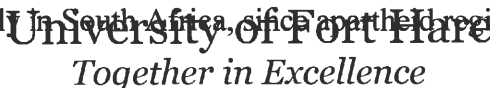
As a way of overcoming the challenge of abandoned agricultural activities, South African government has some support mechanisms in place to stimulate agricultural production as well as commercialization of subsistence agriculture in rural areas. These include: land reform and farmer settlement, production loans scheme for small farmers (Comprehensive Agricultural Support Program (CASAP) particularly for land reform beneficiaries), infrastructure grant for smallholder farmers and the tractor mechanisation scheme. In addition smallholder irrigation projects were initiated in the former homelands with the aim of promoting food self-sufficiency and to contribute to rural development. Among others the motive was to enable farmers to improve their productivity and thus shift the production from home consumption towards a market-oriented production. However, the outcomes of the established smallholder irrigation projects were not as good as expected.

The aim of this study was to explore the role of water use patterns in transition from subsistence communal agriculture to smallholder irrigation agriculture in the former Ciskei homeland area of Eastern Cape Province. This entailed the assessment of smallholder farmers' aspirations and goals to expand irrigation crop production from homestead gardens to irrigation plots and/or from one to more than one irrigation plots as to increase production

thus market participation. The main hypothesis of the study was that smallholder farmers find it difficult to participate in a market-oriented agriculture because of a range of constraints and barriers reducing the incentives for participation. These farmers generally lack land, capital and education to respond quickly to technological innovation and agricultural market opportunities. Thus, it was hypothesized that smallholder farmers have constraints even after the introduction of government support.

6.2.2 Literature review

According to literature, smallholder farmers are farmers which have access to land and practise subsistence farming as one of their livelihood strategies. These farmers produce mainly for home consumption and for sale using family labour for production. Land sizes, purpose of production (subsistence or commercial) and level of incomes (rich or poor) as well as skin pigment particularly in South Africa are the major criteria used to classify smallholder farmers. Apartheid government introduced betterment planning programme which resulted in negative outcomes for African agriculture. The majority of farmers have been excluded from mainstream markets, particularly in South Africa, since apartheid regime.



However, the literature reviewed that in most of Sub-Saharan Africa, over 96 percent of farmers are small, farming less than 5 ha, usually with over two thirds having less than one hectare. Small-scale farms account for over 90 percent of agricultural production. However, with growing economies, subsistence farmers are shifting out of subsistence food crop production (monoculture system) to a diversified market-oriented production system. Nevertheless, the process is sluggish in Sub-Saharan Africa. This is because Sub-Saharan Africa agriculture depends mostly on rainfall for its productivity. Only 4% of arable land in the SSA region is irrigated. Therefore, there is ample scope for increased irrigation in many parts of SSA, particularly for small-scale irrigation and water harvesting.

According to literature, smallholder irrigation is multi-farmer irrigation projects which are larger than 5ha in size that were either established in the former homelands or in resource-poor areas by black people or agencies assisting their development. These smallholder irrigation schemes consist of a number of smallholder irrigators who unite to form a multi-farmer project. The literature indicated that introduction of irrigation brings various potential changes in agricultural production. Irrigation can increase output and value through

intensification of cropping and innovation in crop choice. It can also extend the cropping season to allow multiple cropping, improve the quality of produce and permit new commercial crops and varieties to be grown. It has been highlighted that as the irrigated production comes on stream, its first impact is to increase supply into this market. The tendency for irrigation to lead to concentrated production applies to all irrigation regardless of the prior use of the land. The concentration of production raises the efficiency of marketing by allowing the exploitation of economies of scale. Higher yields, higher cropping intensity and all year round farm production lead to increased market-oriented production, implying a shift in supply (marketable surplus production) and perhaps food security.

The literature also revealed other factors that affect market participation and thus commercialisation of smallholder farmers, these include: adequate land, access to support services, access to credit, market expansion, market liberalisation, urbanisation, decreasing of farming population, rapid increase of demand for food, liberalized and open economic policies and developed infrastructure facilities in farming. Collective action and contract farming were highlighted as the most crucial factors in commercialization process. The contract farming schemes have been attributed for playing a key role in increasing the profitability of crop farming, reducing marketing risks, and above all opening up new markets for non traditional cash crops both at domestic and international level. On the other hand collective action help farmers gain the benefit of assured supplies of the right inputs at the right time, frequently, credit against output deliveries, and an assured market for the output at a price that is not always known in advance.

Literature reveals that throughout Africa efforts are being made by local government and others to encourage subsistence farmers to become commercial producers. Yet in South Africa, after 17 years of independence and great effort and expenditure on the rural sector, there has been little commercialization of production from the rural sector. Still 86% of the agricultural land is commercially run basically by whites and 14% is in the subsistence sector comprised basically by blacks. There has been a clear downward trend in the number of commercial farming enterprises which underscores the needs to grow the commercial agriculture sector to maintain South Africa's food sustainability potential and support interventions to develop skills across the agricultural sector, especially for transformation and development of the small and emerging agricultural sector.

The causes of downward trend have been associated with the slow progress in the transfer of land. It has been indicated that from 1994 to 2009 only 6.9% of agricultural land that has been transferred to beneficiaries through both the redistribution and restitution programme thus far; well short of the 30% government has targeted for the 2014 deadline. It has been highlighted that government failure to support productive use of transferred land may be another cause of downward trend. The literature revealed that in the Eastern Cape that most small black farmers cannot access production loans scheme for small farmers, particularly, CASP support because of the priority placed on land reform. Lastly the withdrawal of government in managing the existing small-scale irrigation schemes was among possible causes of downward trend of commercialization. It is revealed that government withdrew from supporting small-scale irrigation schemes due to the disappointing performance of past investments in terms of: returns to investment; and sustainability of the irrigation schemes.



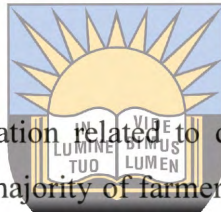
6.2.3 Study area and Methodology

The study was carried out in two villages in Ales and Peddie town, which are situated in the Nkonkobe and Ndlambe local municipalities respectively, falling under the Eastern Cape Province of South Africa. Farmers were divided into two groups depending on the access to irrigation system. Purposive sampling technique was used to select the two villages, namely Melani and Ndlambe. The random sampling method was then used to select 64 smallholder farmers in Melani village and 64 in Ndlambe village in order to come up with 128 farmers. In total 108 smallholder farmers who were members of irrigation scheme or food plots and the other 20 were non members or food gardeners. Out of 108 of membership, 34 members uses manual irrigation (pipes and buckets), that is, rain-fed production while 64 members uses either sprinkler or furrowing. 10 members confirmed that they were using other irrigation. A questionnaire was used as the primary tool for data collection and the process of collecting data involved face-to-face interviews with the household head. As a way of improving data quality, a semi structures questionnaire consisting of closed ended questions was used for data collection.

The data collected through questionnaires was coded and entered into an excel spread sheet before being analyzed using SPSS 18.0 and STATA. Data analysis involved use of descriptive statistics and the binomial logistic regression model. The binomial logistic

regression model was used to test the farmers' perception of market participation that influences households from shifting from subsistence farming towards market oriented production. Binomial logistic regression model was chosen because it is useful in analysing data where the researcher is interested in finding the likelihood of a certain event occurring. In addition to that, decisions are the dichotomous criterion variables and their perceptions are the predictor variables. Truncated regression model was also used to test factors that influence the level of market participation of smallholder farmers. It was chosen in order to accommodate the situation where the data set is naturally split by a criterion that excludes some elements of the sample from responding in the manner anticipated by the chosen dependent variable. In this case the criterion was market participation, meaning that individuals who were not selling their produce were excluded.

6.2.4 Descriptive statistics results



The descriptive results provided information related to demographic, socio-economic and crop production. The results reveal that majority of farmers were males (51%) and that most of them were married (72%). The results also showed that 79% of the sampled household head in the study area had formal education (primarily, secondary and tertiary education); this implies that literacy level amongst the sampled household head was relatively high. The majority of the sampled farmers had access to relatively small arable land areas of approximately 2 hectares and had no title deeds for the land. However, the minimum area under cultivation was found to be 0.05 hectares.

More than half of the farmers indicated that they had at most 5 years of farming experience and did not belong to any farmers association. Over 80 percent of sampled households were growing maize in their home gardens or food plots. The crop choice was regardless of whether a farmer depended on rainfall or used modern irrigation system. On farmer's goals for market oriented production, the results indicated that only 2.3 percent was specifically producing for marketing, 41.1 percent was producing for consumption only while 56.3 percent aimed at producing for both consumption and marketing. On farmers' aspiration, the results indicated that 74.2 percent were willing to increase the scale of production so as to be able to participate in market while 25.8 percent of the sampled household head were satisfied with their production level and therefore not willing to increase production.

6.3.2 Market participation choice and level of market participation results

The model was used to analyse factors that influence the households' decision of market participation. The results of the logistic regression model revealed that type of irrigation used does not influence the market participation decision of the sampled smallholders. These results show that participation *per se* is not influenced by whether the household works under irrigation system or not. The results indicate that access to market is greatly influence the household decision of market participation. The statistically significant variables, at the 5% level were marital status, ability to sustain production, value adding and market access. Alternatively, the results of the truncated regression model revealed that membership on irrigation scheme or community garden as well as market access significantly influence the level of market participation. The variables were statistically significant at 10 percent and 1 percent significance level.

6.3 Conclusion



The broad objective of the study was study is to explore the trends in commercialization of communal agriculture in rural areas with special reference to the former Ciskei homeland area of Eastern Cape Province. One of the specific objectives was to assess the role of water utilisation in the transition of smallholder farmers from subsistence farmers towards market oriented production. The study focused on assessing market participation based on membership on food plots or irrigation scheme and non members (home gardeners). The results revealed that out of 128 sampled households, 108 households were members of food plots and irrigation schemes while only 20 were non members. However, only sampled household head from Ndlambe village had access to irrigation system while sampled household head from Melani depended on rain-fed production in community gardens. All those who had no access to modern irrigation confirmed that they use manual irrigation (i.e watering cans, pipes *etc*) in cases where there is no rainfall.

This study used both type of irrigation used variable and access to markets variable to investigate the influence of each variable on market participation and level of market participation. The results suggest that type of irrigation used does not have influence on smallholder farmers' choice of market participation. The results proved the negligible influence of type of irrigation used on market participation choice. Instead access to markets

and ability to sustain production were found to greatly influence the households' decision of market participation. Alternatively, on the results of quantity decision, access to market was also shown to have a great influence on the level of market participation. The results clearly indicate that access to market greatly influences both smallholder farmers' choice of market participation and quantity decision of the sampled households.

On the basis of the foregoing results, a number of conclusions can be drawn in respect to trends in commercialisation of communal farmers of the Eastern Cape and role of irrigation in the whole process. The study conclude that with good market access, smallholders are encouraged to consider market participation as priority and divert very little of their produce to home consumption. The implication is that access to market result to increased market participation as well as level of market participation.



The explanations for the relationship between the significant variables, market participation can be summarised as follows:

- ❖ Improved market access is likely to increase the probability of market participation by smallholder farmers as well as the market participation.
- ❖ Smallholder farmers who have the ability to sustain production are more inclined to market participation compared to households who fail to sustain their production.
- ❖ Smallholder farmers who work under irrigation scheme are likely to participate in markets compared to those who depend on rainfall. Smallholder farmers who practise farming in community gardens or irrigation scheme food plots are likely to supply large quantity to market compared to smallholder farmers who practise farming in home gardens.

Policies targeted at improving market participation as well as level of market participation are discussed in the following section. It is also important for the farmers to identify the areas where they can have a direct impact and make efforts to address them.

The study also examined the influence of membership on food plots or irrigation system on farmers' choice of market participation and level of participation. The findings indicated that

membership on community garden or irrigation scheme does not have much influence on household's market participation decision.

6.4 Recommendations

With regard to the smallholder farmers' marketing challenges revealed by the empirical results, policy recommendations can be suggested. This section gives a series of options that can be considered in South Africa, in an effort to help smallholder farmers to fully participate in market.

❖ Encourage collective action

The results of this study revealed that the majority of smallholder farmers did not belong to any association. They relied on their inadequate farming experience for production. These results also suggest that as long as the majority of smallholder farmers are not members of farmers' association, market participation will be diminutive. Thus, institutional policies that increase information on farmers association are needed.



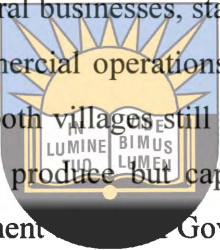
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❖ Promote contract farming

Literature highlighted that contract farming is one of the crucial factors for commercialisation of smallholder farmers. However, the data survey results reveal that 71.9% did not have any contracts with reliable markets. In addition, binary regression results reveal that access to markets is significantly affecting the market participation decision of the sampled household. Contract farming is encouraged because over the years it has been considered as one system that has considerable potential for providing a way to integrate smallholder farmers in developing countries into market participation and thus commercialization. It is believed to help farmers by providing new technology, ready markets and secured inputs and prices. However, to get contractual deals, farmers should be able to supply a relatively larger output to markets. Thus it is important for extension officers or the department of agriculture at large to equip smallholder farmers with the information about contract farming. Having adequate information would enable them to get contractual deals.

❖ Provision of information about credit access

In order for farmers to participate in market, they must be willing and able to increase production beyond their own consumption. However, they will need seeds, processing tools, and transportation vehicles, among other things. There are few farmers that have successfully increased production enough to significantly meet required market demand. A major obstacle is the high startup capital required to begin the enterprise. A major issue for farmers is lack of capital. Most farmers do not formally own land that can be used as collateral for a loan from commercial banks. Literature declared that there are programs in place to assist farmers. To mention one among others, Micro-Agricultural Finance Initiative of South Africa (MAFISA) was developed by the government as an appropriate system that will contribute to supporting the working poor to run existing agricultural businesses, start new agricultural businesses and be able to develop these into fully commercial operations. However, it is so disappointing that 89.8% of smallholder farmers from both villages still depend on personal savings. This implies that these farmers are willing to produce but capital is the constraint. Thus, it is important for research institutes, government and Government Organizations (NGO) to provide smallholder farmers with the current information on credit access.



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❖ Review policy of land distribution on food plots or irrigation schemes

Land is central in promoting rural livelihoods in Africa because access to adequate land and security of tenure are the main means through which food security and sustainable development can be realized. However, the findings indicate that 74.2 percent of the sampled households did not have adequate land for production. Most plots in irrigation schemes or food plots did not exceed 0.5 ha and they were regarded as food plots, because farming on these small plots was shown to serve primarily as a source of food for plot-holder households. This therefore implies that land holding size could be an important constraint to market participation even if irrigation access is ensured. Therefore appropriate land policies, therefore, are crucial to ensuring economic survival, for increasing production and putting communities on a steady course of sustainable development.

❖ Train farmers on use of irrigation system

As in many areas in SSA, small-scale irrigation schemes in the Eastern Cape Province are of great importance for the livelihood of many families. It is believed that small-scale irrigation schemes could play an important role in rural development because of their potential to provide food security, income and employment opportunities. The results indicate access to markets and ability to sustain production greatly influences the decision of market participation. The findings further indicate that access to irrigation does not have much influence on market participation. In addition the data survey illustrates that there is no significant difference in the crop choice of irrigation users and non irrigation users. It is believed that irrigation users should produce high value crops as they are not constrained by water shortages. This therefore, clearly indicates underutilisation of irrigation system. Thus, trainings that increase information on irrigation system operations and benefits of utilising irrigation system are needed.



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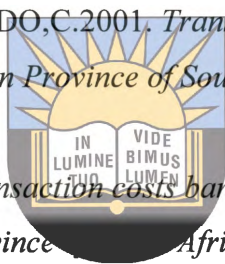
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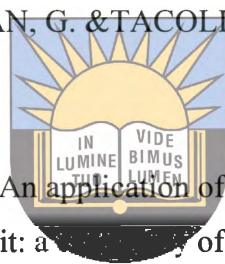
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APPENDIX 1

Questionnaire for the smallholder farmers

All information provided will be treated as strictly confidential

TRENDS IN COMMERCIALISATION OF COMMUNAL AGRICULTURE IN THE EASTEN CAPE PROVINCE

General Information

Name of interviewer	
Date of interview	
Respondent's Name	
Telephone Number	
Local Municipality	



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1. Household characteristics

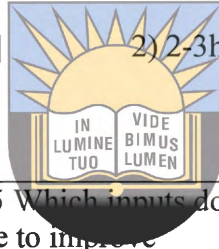
1.1 Age of household head (years)	1.2 Sex of household head 1 = Male 2=Female	1.3 Marital Status 1= married 2=single 3=Divorced 4 =widow 5= separated	1.4 Education level 1= no formal education 2=Primary,3=Secondary 4=Tertiary

2. Land and farming

A Homestead gardens/ plot

2.1 Do you have homestead garden or plot? 1) Yes [] 2) No []

2.2, If Yes what is the size? 1) 1-2 ha [] 2) 2-3ha [] 3) 3-5 ha [] 4) 5-10 []
5) >10 []



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2.3 Crops grown 1= Vegetables 2= Fruits 3= Maize, pumpkin 4= all	2.4 often do you plant in garden? 1= once a year, 2= twice a year, 3= thrice a year, 4= throughout the year	2.5 Which inputs do you use to improve productivity? 1= fertilizer, 2= kraal manure, 3= Pesticides &/herbicides, 4= treated seeds, 5=other	2.6 For what purpose do you produce? 1=Domestic consumption only 2= Cash economy only 3= Domestic consumption &cash economy 4= Any other

2.7 How long have you been farming? (Actual years)

2.8 Have you tried to be allocated more land? 1) yes [] 2) No []

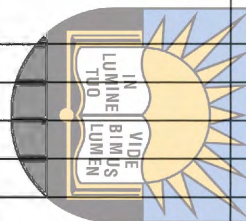
2.9 What are the six major crops grown and area under each? (Complete table below)

Crops grown	Area (record ha as given by farmer)	Total production (records units given by farmer)		Do you use all accessible land? Yes=1 no=2	If no, give reasons? 1= lack of farm implements, 2= lack of capital, 3= lack of skills, 4= soil morphology, 5= lack of interest in farming 6= water shortage 7= lease agreements
		2009/10 season	2010/11 season		

3. Level of entrepreneurial

Description	Please rate/Rank as indicated below with a tick [√]			
	<i>Strongly Disagree</i>	<i>Disagree</i>	<i>Agree</i>	<i>Strongly Agree</i>
You are not afraid to try a new technique				
Irrespective of any challenges I continue trying till the solution is got				
If there is a change in supply and demand, you take action faster before any government response				
Take action always on the basis of what you perceive profitable				
Do not wait for subsidies before applying new technology				
Not afraid to be different when adopting new technologies on your farm				
Spend more time on new technologies where you anticipate profits				
You are not afraid of investing more money in new technologies				
Risks of new technologies isn't your first priority to take a decision				
Can supply produce on credit				
I am willing to pay for training				

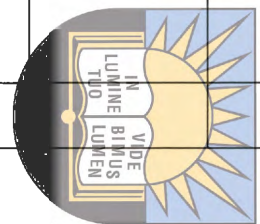
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4. Water sources

4.1 What is your source of water? 1= river 2=dam 3= bore whole 4=windmil 1 5=water tank 6 rain, 7= other	4.2 Do you have access to irrigation system 1=yes, 2=No	4.3 If yes, what type of irrigation system do you access? 1=sprinkler 2= Dip irrigation 3 Furrow irrigation 4= other (specify)	4.4 Who provided irrigation system? 1=Government 2= NGO 3=Local Municipality 4=Own funds 5=Other (specify)	4.5 Are you a member of an irrigation schemes? 1=yes 2= No	4.6 If Yes, how long you have been a member (actual years)	4.7 If No, Why = no funds 2=social conflicts 3=lack information 4=not interested	4.8 How long it has been operating (actual years)	4.9 What are the conditions of the irrigation system? 1= no longer working 2=Poor3=fair4=good	4.10 If is no longer working what could be the reasons? 1= water shortages, 2=poor management, 3= underutilized, 4= mechanical issues, 5=low production and profitability, 6= other specify
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4.11 What area of land did you cultivate before/after installing irrigation system?

	Periods	
	Before irrigation system	After irrigation system
Land area (ha)		
Yields		
Quantity sold		

5. MARKETING MANAGEMENT MODULE

5.1 Do you have access to Market? 1=yes 2=No	5.2 If Yes, what type of Market? 1= formal 2= informal 3= do not sell	5.3 Why do you use the market you are using? 1= lack of market info 2= lack of transport 3= its profitable 4= easy access 5= other	5.4 Point of sale you use 1=Nearest town 2= supermarkets 3= road side 4= farm gate 5=around village 6= other

5.5 Are you able to sell the quantity that you want to sell? 1) Yes [] 2) No []

5.6 If no, why? 1) No Market [] 2) hard land acquisition [] 3) lack of capital [] 4) water shortage [] 5) other []

5.7 Provide the information about water use, production calendar, sales and crop utilization, complete the table below.

Crop 1=Cabbage 2= Spinach 3= tomato 4 Potatoes 5=Carrots 6=butternut 7= maize 8 other	Water system 1= Rain fed 2= irrigation 3= both	Season 1 =summer 2 =winter	Quantity (ton/kg) harvested	Quantity (ton/kg) sold	Price /kg	To whom sold	Qty consumed at home	Qty donated to friend & family

<p>5.9 Do you always find a market for all the goods you produce? 1= yes 2= No</p>	<p>5.10 If NO, what happens to the unsold produce? 1= Lose to spoilage 2= Eat ((family and friends) 3= Sell at low prices 4= Store and sell later 5= Process it</p>	<p>5.11 What is the main reason for selling your produce? 1= I produce mainly for sale, 2= I want to pay loan 3= I need cash for home consumption, 4= I need cash for cattle purchases, 5= I need money to pay school fees, 6= Other (specify)</p>	<p>5.12 Do you conduct price surveys, before selling? 1= yes 2= No</p>	<p>5.13 How is a price set during the sales? 1= we negotiate, 2= it is market driven, 3= it is dedicated by buyers, 4= Other (Specify)</p>	<p>5.14 Before selling your produce what value adding activities do you perform? 1= washing 2= packaging, 3= Processing, 4= cutting, 5 = other</p>	<p>5.15 How does value - adding help? 1= better prices, 2= More buyers 3= safer storage, 4= Other</p>



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6. INSTITUTIONAL SUPPORT SERVICES

6.1 Are you a member of any organization? 1)Yes [] 2)No []

6.2 If yes, what is the name of the organisation

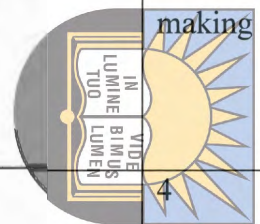
6.3 If no, what is the reason for not joining 1) social conflicts [] 2)lack information [] 3)not interested 4) selection criteria []

6.4 Do you receive extension services? 1)Yes [] 2)No []

6.5 If yes, which services do you receive; if no which services would you like to receive?

Services	Value adding	Advice on crop production	Advice on marketing	Advice on decision making	Advice on record keeping
	1	2	3	4	5

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6.6 Provide information on institutional finance

Do you have access to credit Yes No	If yes, source 1) Commercial Bank 2) Agricultural cooperative 3) Land bank 4) Agri-mar 5) Family and friends 6) stokvels 7) credit club 8) other	What was the purpose of the loan? 1) Buy inputs 2) Pay labour 3) Transport produce 4) Processing produce 5) Storage 6) School fees 7) Food 8) Other (specify)

7. Labour and Investment

7.1 What is the main source of labour?

- 1) Family labour [] (2) Hired labour [] (3) Both []

7.2 Who do you work with in the field?

- 1) Husband/ Wife [] 2) children [] 3) extended Family []

7.3 How many hours do you work per day?



	In Agric	At home	Off- farm work
Head of household			
Wife / husband			
Children			
Others			

7.4 have you ever made investments in your plot/garden? 1) Water harvesting [] 2) windbreaks [] 3) irrigation pipes [] 4) other []

7.5 What are your plans for the next planting season? 1) Focus more on cash crops []
2) focus on staple food crops [] 3) quit farming [] 4) seek for more land [] 5)
increase production [] 6) other []

7.6 would you like to invest more on farming? 1) Yes [] 2) No []

7.7 If Yes Why? 1) Profitable [] 2) stable food [] 3) decreases
expenses [] 4 other []

7.8 Do you have knowledge on production increase? 1)Yes [] 2)No []

7.9 Is your production sustainable? 1) Unsustainable [] 2) With support []
]3) Sustainable without support []



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