

**Analysis of Entrepreneurial Behaviour of Smallholder Irrigation
Farmers:
Empirical Evidence from Qamata Irrigation Scheme**



University of Fort Hare
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*A Dissertation Submitted in Fulfilment of the Requirement for the Degree of
Master of Agriculture (Agricultural Economics)*

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DECLARATION

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

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ABSTRACT

Albeit much effort having been put to review the performance trend of smallholder irrigation farmers in South Africa. However, there seems to be a paucity of information regarding the level of entrepreneurship on these farmers. Most research works on smallholder irrigation farmers have mainly focused on livelihoods trajectory providing a review on how the welfare of the rural poor has been transformed after the introduction of irrigation schemes. With most research evidence indicating a high degree of underperformance on most smallholder irrigation schemes, this research attempted to investigate the level of entrepreneurship among the small holder irrigation farmers.

In order to achieve the main research objective, a sample of 110 farmers drawn from Qamata irrigation scheme was interviewed and each farmer's performance on the nine components of entrepreneurship was assessed. The aspects assessed to determine the farmer's entrepreneurial behaviour were: planning ability, risk taking, achievement motivation, leadership ability, Cosmo politeness, decision making, and innovativeness and farming knowledge. Basing on previous studies which indicated entrepreneurial behaviour to be influenced by several factors the study also analysed the determinants of entrepreneurship among the irrigation farmers and a binary logistic regression model was used to establish the connection between various independent variables and the farmers' entrepreneurial performance given as a total score of the nine components.

Though the findings of the study revealed a prevalently low level of entrepreneurship among the smallholder irrigation farmers on Qamata irrigation scheme, a high proportion of the respondent farmers (65.5% and 60.5%) showed to have a high degree of achievement motivation and decision making ability, respectively. The observed trend thus reflected that smallholder farmers have a potential to become entrepreneurs and are willing to succeed. The binary model results revealed that the prevailing land tenure system will be a strong determinant of the farmer's level of entrepreneurship. Equally, levels of training in farming, motive for farming and information seeking tendency also proved to have a significant influence on the degree of farmer entrepreneurship.

Based on the results of this study recommendations have thus been drawn on the need for policies and practices aimed at promoting entrepreneurship and not dependency among farmers. Key focus areas identified include: the need to revise the current land

tenure system on irrigation schemes, intensify on entrepreneurship training for both farmers and extension officers and regular on-farm training on new technologies.

Key words: smallholder irrigation scheme, entrepreneurship, entrepreneurial behaviour, entrepreneur, smallholder farmer

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LIST OF ABBREVIATIONS

ANC:	African National Congress
DAFF:	Department of Agriculture Forestry and Fisheries
DBSA:	Development Bank of South Africa
GEAR:	Growth Employment and Redistribution
GEM:	Global Entrepreneurship Monitor
IPTRID:	International Programme for Technology and Research in Irrigation and Drainage
FAO	Food Agriculture Organisation
MFPP:	Massive Food Production Programme
NPC:	National Planning Commission
NPD:	National Development Plan
OECD:	Organisation for Economic Co-operation and Development
PTO:	Permission To Occupy
QIS:	Qamata Irrigation Scheme
RDP:	Reconstruction and Development Programme
SIS:	Smallholder Irrigation Scheme
TEA:	Total Early stage Entrepreneurship
UNWWD:	United Nations World Water Development
WEF:	World Economic Forum

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CHAPTER I

INTRODUCTION

1.1. Background

The agricultural potential of the bulk of South Africa's land is limited, with over 60 per cent of the country receiving less than 500mm of rain per annum on average, and with only 10 per cent receiving more than 750 mm (World Bank 1994; 28). Rainfall is erratic, droughts are common, and crop production in most of the country is inherently risky, making irrigation important for a range of field and tree crops (Cousins 2012). Investment in irrigated agriculture has always been a key focus area in the agricultural development policies for both colonial and post-colonial South African governments. Currently 1.3 million hectares of the country is under irrigation and this amounts to ten percent of the country's arable land.

Around 7.7% of the irrigated land, or 100 000 hectares, is used by smallholder farmers, mostly in the former Bantustans (van Averbeke and Khosa, 2011). Most of these smallholder irrigation schemes were established during the colonial era following the recommendations of the Tomlinson commission of 1955 with their primary goal being to improve rural livelihoods through sustainable crop production for food security and poverty alleviation (Kay, 2001). However, because of poor performance, the development objectives of smallholder irrigation schemes remain largely unfulfilled (Yokwe, 2009; Fanadzo *et al.*, 2010).

Even with their widely reported underperformance, smallholder irrigation schemes continue to be viewed as a mainstay for employment, poverty alleviation and food security among the country's rural poor. Currently the government has made a proposal to create viable rural agricultural enterprises capable of generating employment and transform rural livelihoods by 2030. According to the government's current policy document '*The National Development Plan*', : one million new jobs can be created in agriculture and related industries over the next two decades, mostly through labour-intensive small-scale farming in communal areas and on redistributed land, with many engaged in irrigated farming (National Planning Commission, 2011;197). The proposals presented in the National Development Plan vision 2030 clearly highlight government's conviction that sustainable rural development can only be attained through the

transformation of smallholder subsistence farms into commercially oriented farming units driven by market and the need to make profit.

Though much talk has been made on the need to create jobs in the agricultural sector not much emphasis has been directed on the need to uplift entrepreneurship and creating a supportive environment for small businesses (Sunter, 2011). With previous efforts to commercialise communal agriculture having failed to yield the expected outcomes (Obi *et al.*, 2011) a lot of scepticism has emerged regarding the NPC's proposed rural turnaround programme. Farmer organisations like Agriculture South Africa (AgriSA) continue to hold reservations on the ability of smallholder agriculture farmers to engage in commercially viable agriculture. Making corresponding arguments Shah *et al.*, (2002) have cited the problem of over dependency emanating from the former "Bantustan" agricultural policies as a key hindrance to the smallholder irrigation farmers' progression.

Similar sentiments had been echoed earlier by Bembridge (2000) who pointed out that "Scheme managers under the homeland government as "attempting to 'manage' farmers rather than encouraging entrepreneurial development."

Despite more than two decades since the formation of a new democratic South Africa, the majority of the farmers on irrigation schemes are the aged farmers who have been on the schemes since the colonial era. It is therefore worth noting that though there have been a lot of changes on the agricultural policies over years the group of farmers affected by such policy interventions has not changed much. Surveys conducted on irrigation schemes located in former "Homelands" have provided similar trends of low organisational capacity among the farmers, with farmer groups facing difficulties to take up activities previously performed by the state (Shah *et al.*, 2002).

With the government continuing to place its hope for rural transformation on smallholder agriculture the big question that can be raised is; do smallholder irrigation farmers who have been 'spoiled' by the by heavy state subsidies from the "Bantustan" government have the capacity to transform their rural farming enterprises into more viable engines for the rural economy? Do these irrigation schemes have farmers capable engaging in market oriented or capitalist agriculture without heavy dependency on the state?

1.2. Problem statement

At the dawn of independence the new democratic government of South Africa led by the African national congress (ANC) faced a formidable task of rectifying the ills created during the 350 years of colonial rule. As a result of government's efforts to fight poverty in South Africa, the percentage of persons living below the poverty datum line has decreased from the 59.3% recorded in 1994 to 41.4% in 2009 (Leibbrandt *et al.*, 2010). Though the levels of poverty seem to have decreased the level of inequality seems to have increased. Giving references to South Africa's Gini coefficient of 0.70, Leibbrandt *et al.*, (2010) describes the country as being among the most unequal countries in the world.

Poverty in South Africa has also remained predominantly rural and in the first decade after independence 70 percent of the country's poor were rural dwellers (Terreblanche, 2002, Machete, 2004). In 2001 the Eastern cape province had the highest proportion of the of persons living under the poverty datum line. A report published for the Human Science Research Council by Makiwane *et al* (2010) indicates that in 2007 a quarter of the households in the Eastern Cape Province earned a monthly income of less than R400 and the majority of such households were in rural areas.

Since 1994 the government implemented several reforms aimed at fighting rural poverty under the auspices of Reconstruction and Development Programme (RDP) a national framework adopted to address the issues of poverty and inequality (ANC, 1994).

The RDP was aborted in 1996 amid a public debate on what it really meant for economic policy (Aliber, 2003: Manona 2005). RDP was replaced by Growth, Employment and Redistribution Strategy (GEAR) which was seen as a more inclusive framework to address a wide range of challenges affecting the nation. Under the RDP, GEAR and more recently the National Development Plan (NDP) several efforts have been made to reduce rural poverty through development of the smallholder agriculture sector. Smallholder irrigation schemes located in the former homelands became the main focus area with government and non-governmental organisations offering a wide range of support to resuscitate production on these irrigation schemes.

One of the programs launched to address the low production on SISs was the Massive Food Production Program (MFPP). The program was launched in 2003 in the Eastern

Cape Province with the aim of alleviating poverty and enhancing food security among the rural poor. (Jacobson, 2013) .The Massive Food Production Program was characterised by heavy agricultural subsidies, together with intensive state investment on mechanised agriculture. Similar programmes heavily dependent on state coffers were also implemented in other provinces across the country. In the Limpopo province alone assets purchased by state for 177 irrigation schemes were valued at R4 billion (Machete *et al* 2004). Huge state funding was done with the expectation that beneficiary farmers will over time build up their own capital, market their produce, and manage risk while transforming their agronomic practices.

In contrary to the government's expectations the efforts to revive the smallholder agriculture have brought about limited success. Smallholder agriculture has continued to deteriorate with most dry land farmers abandoning their plots and resorting to other means of livelihood such as grants, remittances and livestock farming. The situation is gloomier in smallholder irrigation schemes where most farmers continue to engage in subsistence agriculture and remain entombed in abject poverty amid a backdrop of abundant irrigation water supply and aligned government support services.

The situation prevailing in most irrigation schemes is so dire, a report by van Averbeke *et al* (2011) indicates that in 2010; of the total 302 irrigation schemes in South Africa 206 were somewhat operational while 90 were dysfunctional. Comparable observations were also made in the Eastern Cape by Obi (2011), who in his study, cited disturbing trends of poverty among households who regarded agriculture as their main source of livelihood. Consequently, the demise of smallholder farmers and smallholder irrigation schemes in particular has deepened the pre-existing scepticism with regards to the contribution of smallholder agricultural production to both rural and national economic development. This paradoxical scenario creating a depiction of "wasted resources" has prompted for this research focusing on the entrepreneurial component of the smallholder irrigation farmers.

The role of entrepreneurs as economic change agents bringing transformation in any economic sector is pertinent. The possession of entrepreneurial qualities such as risk taking and innovativeness by farmers should have a positive effect on their productivity

and success. Nonetheless, does it follow that smallholder irrigation farmers perceived as entrepreneurial always demonstrate high productivity than those labelled as non-entrepreneurial? By investigating the entrepreneurial behaviour among smallholder irrigation farmers this research seeks to establish the nexus of causality between entrepreneurial levels and farmer's productivity.

1.3. Objectives of the study

The broad objective of this study therefore is, to establish the level of entrepreneurship among smallholder irrigation farmers so as to help in formulating future policies on smallholder irrigation investment. The specific objectives in line with the broad objective are:

- To determine the entrepreneurial behaviour among the irrigation farmers at Qamata
- To identify the social, economic and institutional determinants of entrepreneurship among irrigation farmers
- To determine the effect of entrepreneurship on farmer productivity
- To interpret the findings from a policy perspective

1.4. Research questions

- What is the level of entrepreneurship among irrigation farmers?
- What underlying factors influence the farmers' entrepreneurial behaviour?
- Does the farmer's level of entrepreneurship affect their productivity?

1.5. Hypotheses

The null hypotheses to be tested in respect to the aforementioned objectives are:

- Farmers at Qamata irrigation scheme show low level of entrepreneurship which hinders their productivity.
- There is no significant causality between the determinant factors and entrepreneurial behaviour.
- There is no relationship between farmers' level of entrepreneurship and productivity.

1.6. Research Design

Objective	Research questions	Null hypothesis	Data collected	Analytical tools
<ul style="list-style-type: none"> • To determine the level of entrepreneurial behaviour among the irrigation farmers 	<ul style="list-style-type: none"> • What is the level of entrepreneurship among irrigation farmers? 	<ul style="list-style-type: none"> • Farmers show a low entrepreneurial behaviour which hinder their productivity 	<ul style="list-style-type: none"> • Innovativeness • Farm decision-making • Achievement motivation • Knowledge of farming enterprise • Risk taking ability • Leadership ability • Cosmo politeness • Planning ability 	<ul style="list-style-type: none"> • Descriptive statistics
<ul style="list-style-type: none"> • To identify the social, economic and institutional determinants of entrepreneurship among irrigation farmers. 	<ul style="list-style-type: none"> • What underlying factors influence the farmers' entrepreneurial behaviour? 	<p>There is no significant causality between the determinant factors and entrepreneurial behaviour.</p>	<ul style="list-style-type: none"> • Demographic • Human and social capital • Production • Land tenure 	<ul style="list-style-type: none"> • Binary logistic regression • Descriptive statistics
<ul style="list-style-type: none"> • To determine the effect of entrepreneurship on farmer productivity 	<ul style="list-style-type: none"> • Does the farmers' level of entrepreneurship affect their productivity? 	<p>There is no connexion between farmers' entrepreneurial level and productivity.</p>	<ul style="list-style-type: none"> • Farm income • Yield 	<ul style="list-style-type: none"> • Binary logistic regression

1.7. Relevance of the study

Findings of this study will possibly contribute positively to the formulation of policies on interventions for smallholder irrigated agriculture. Given the increased drive for the expansion of rural agriculture shown by the government of South Africa, results of this study can be of much relevance in a number of aspects as outlined below:

- a) Assessment of current performance of the smallholder irrigation schemes and identification of opportunities for further expansion.
- b) Reveal the prevailing entrepreneurial level among farmers and to identify areas of development in respect of uplifting the farmers' entrepreneurial skills. In this regard future programs should consider farmers' skills and commitment as a key aspect in selecting beneficiaries to be settled on any irrigation scheme. The fact is: "not everyone is a farmer".
- c) Reviewing of the current agricultural policy with the aim of coining a more sustainable approach that ensures growth and independence rather than absolute dependency.

1.8. Research outline

This dissertation consists of six chapters, the content of which is organised as follows; **Chapter 1** presents the introduction and the background of the research study specifically looking at the smallholder irrigation context in South Africa and the research and developmental gaps on entrepreneurship in this sector. **Chapter 2** reviews literature on different theories on the concept of entrepreneurship with special emphasis on the various indicators of entrepreneurship. Further review is also made on the entrepreneurial activity in South Africa together with the essence of entrepreneurship as a pillar in rural development. The general trends shaping the country's agriculture systems are also discussed with a distinctive emphasis given on the smallholder irrigation performance and factors hindering entrepreneurship in the sector. At the end of this chapter a conceptual frame work is presented to give an overview of the key issues covered in the study.

Chapter 3 provides the description of the study area in terms of physical location, demographics, socio economic profile and the agro ecological background of the

study area. The research methodology is explained in **chapter 4**. Under this chapter the data collection tools, sampling methods and the sample design are clearly presented. The chapter also presents the statistical tools used to analyse the data and the rationale of their choice. **Chapter 5** presents the research findings starting by the providing descriptive statistics on the socio economic and demographic characteristics of the respondents. Research findings on the level of entrepreneurial behaviour of farmers are presented using descriptive statics followed by model results explaining the conjectured hypotheses. The absolute goal in this section is to establish the nexus between various independent variables and farmer entrepreneurship. **Chapter 6** wraps up the study by presenting the research summary, conclusions, recommendations and areas of further study.

CHAPTER 2

LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK

2.1. Introduction

This chapter seeks to provide a broader review of smallholder agriculture and the concept of entrepreneurship in the agricultural setting. It starts by providing various theories that explain the concept of entrepreneurship. This is followed by a detailed elaboration on the components of entrepreneurial behaviour investigated in this study. Subsequently an overview of the South African agriculture system followed by an elaborate description on the role of water on agricultural productivity is provided. Following is a review on trends that have shaped smallholder irrigation in a pre and post independent South Africa. Having explained the various theories and related views on entrepreneurship the chapter ensues by providing a qualified account on the role of entrepreneurship in economic development. The present entrepreneurial performance of South Africa as discussed by the Global Entrepreneurship Monitor (GEM) is also underscored. The chapter proceeds by highlighting the possible challenges affecting entrepreneurship development for the nation South Africa in general and for smallholder farmers in particular. At the end a conceptual frame work showing the nexus between entrepreneurial behaviour and the determinants of such behaviour is presented.

2.2. Understanding the Entrepreneurship Concept

Entrepreneurship, a form of human behaviour, is indispensable for the growth and development of any society or economic sector , thus the success of any farming enterprise is determined by the efficiency and magnitude at which the entrepreneur combines the other factors of production namely land, labour and capital.

The term entrepreneurship means different things to different people and as noted by (Lambing and Kuehl, 2000: 14), a lot of confusion continue to exist over the definition of entrepreneurship this despite the term having been used for more than 200 years. Numerous sociological, economic, cultural and psychological theories

have been put forward to explain the science of entrepreneurship. In attempting to solve the mystery surrounding the meaning of the term “entrepreneurship” a detailed presentation on various theories which have been crafted over time are presented in this section.

The term entrepreneur is also defined in a variety of ways. The concept of entrepreneur varies from country to country as well as from period to period and the level of economic development thoughts and perception. A review of fundamental theories on entrepreneurship will also seek to establish the key components shaping an entrepreneur.

A closer look at entrepreneurship from various scholarly perspectives will provide an understanding on the basing point on which present day entrepreneurial theorists have driven their definitions. These different definitions and views will be presented throughout this section and the underpinning logic between these differences will be highlighted.

2.2.1 Cantillon and Say’s Economic Entrepreneur Theories

The word ‘entrepreneur’ is derived from the French verb ‘entreprendre’. It means, “To undertake”. In the early 16th century, the Frenchmen who organized and led military expeditions were referred to as “entrepreneurs”. Given the origins of the word it should not be surprising that Cantillon (1680-1734) an economist credited as one of the first major economic thinkers to define the entrepreneur and use the term ‘entrepreneurship’ in an economic context was a French citizen.

Cantillon introduced an economic system which was based on three classes of economic agents namely; landowners, hirelings, and entrepreneurs. Landowners were regarded as a financially independent aristocracy. Hirelings and entrepreneurs were viewed to be financially dependent on others. Hirelings earned fixed incomes while entrepreneurs were “...set up with a capital to conduct their enterprise, or undertakers of their own labour without capital, and they may be regarded as living off uncertainty” (Cantillon, 1931 in Pittaway, 2011).

For Cantillon the entrepreneur was the most active among these three agents, connecting the producers with customers. The entrepreneur acted as an agent who

purchased a good at a certain price, used that good to produce a product and then sold that product at an uncertain price. Risk and uncertainty played central parts in this theory of the economic system. As noted by Pittaway (2011), Successful entrepreneurs were those individuals who made better judgments about changes in the market and who coped with risk and uncertainty better than their counterparts.

The ideas of Cantillon were further improved by Say (1767-1832). Say, the first professor of economics in Europe (Binks and Vale, 1990) improved Cantillon's definition by adding that the entrepreneur brings people together to build a productive item. Say's theory of production and distribution was constructed on three major agents of production: human industry; capital in which he included both physical capital in the form of machines and money capital; and land, in which he included other natural resources. Say recognized that both land and capital were indispensable to production; he however, placed the 'key' to production with human industry (Barreto, 1989). As noted by Koolman (1971, p. 271) Say, proceeded to make a tri-partite division of human industry into; "...*effort, knowledge and the applications of the entrepreneur*". As indicated in figure 2.1, Say's theory of production and distribution viewed the entrepreneur as the coordinator of the system, acting as an intermediary between all of the other agents of production and taking on the uncertainty and risk.

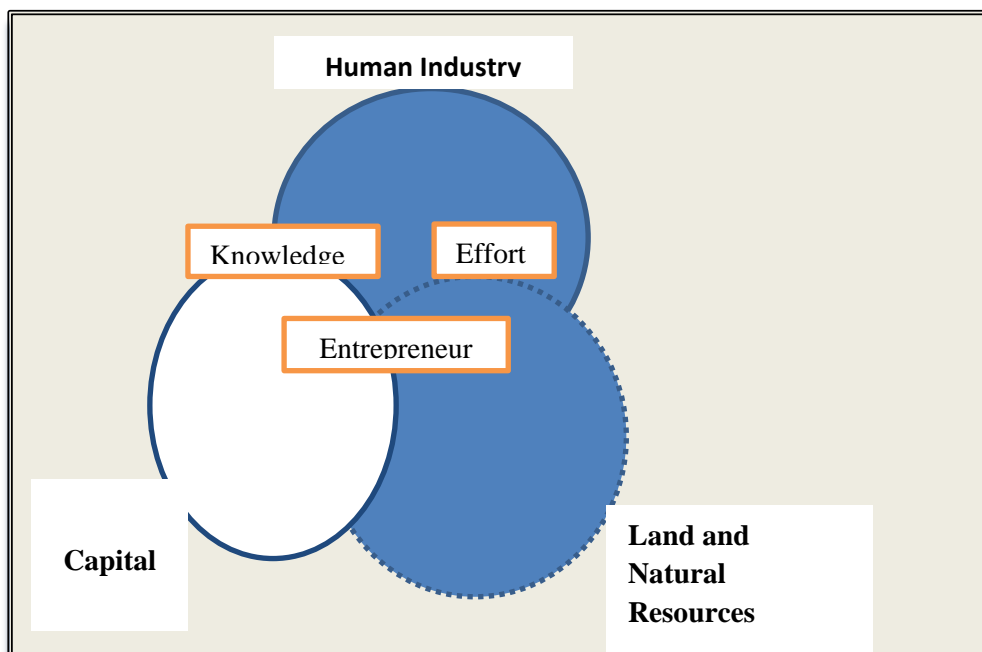


Figure 2: 1 Say's Production and Distribution Theory

The profit the entrepreneur gained was the reward for the risk undertaken. Say's interpretation of an entrepreneur was also shared by Frank Knight (1885-1972) who viewed risk-taking as a central characteristic of entrepreneurship.

2.2.2 Max Weber's Sociological Theory

The sociological theory on entrepreneurship holds social culture as the driving force of entrepreneurship. The entrepreneur becomes a role performer in conformity with the role expectations of the society, and such role expectations base on religious beliefs, taboos, and customs. Max Weber (1864-1920) held religion as the major driver of entrepreneurship, and stressed on the spirit of capitalism, which highlights economic freedom and private enterprise. Capitalism thrives under the protestant work ethic that harps on these values. The right combination of discipline and an adventurous free-spirit define the successful entrepreneur.

2.2.3 Schumpeterian School of Thought

While much economic thought had focused on the role of the entrepreneur in economic systems before the 1920s many contemporary researchers trace the origins of modern thought in entrepreneurship back to Joseph Schumpeter's work (1934; 1965). Schumpeter's theories of the economic system and the role of entrepreneurship within it have been widely discussed (MacDonald, 1971; Shionoya, 1997).

Schumpeter's concept is a synthesis of three different notions of entrepreneur: risk bearer, innovator and a coordinator cum manager. He assigned the role of innovator to the entrepreneur and not to the capitalist. Capitalists supply capital while entrepreneurs innovate. He stated that "whatever the type, everyone is entrepreneur only when he actually carries out a new combination and loses that character as soon as he has built up his business, when he settles to running it as other people run their business". In other terms Entrepreneurship is a temporary condition for any person, unless he keeps on innovating.

In Schumpeter's theory, the function of the entrepreneur was that of a person who innovates or makes 'new combinations' of production possible. The concept of 'new combinations' covered five potential cases:

- The introduction of a new good or a new quality of a good;
- The introduction of a new method of production;
- The opening of a new market;
- The development of a new source of supply or raw-materials or half manufactured goods;
- The carrying out of a new organization of any industry

Schumpeter perceived the entrepreneur as someone who disrupts an existing equilibrium through innovative actions. Once their innovative role has been completed entrepreneurs revert back to the normal economic activity.

In his later studies Schumpeter (1965) redefined the entrepreneur as "an idea man and a man of action who possesses the ability to inspire others, and who does not accept boundaries of structured situations. He is a catalyst of change instrumental in discovering new opportunities, which makes for the uniqueness of the entrepreneurial function".

Several contemporary entrepreneurship theorists have come with definitions that resonate to Schumpeter's innovative entrepreneur; Ganeshan (2001) defined entrepreneurship as the capacity for innovation and calibre to introduce innovative techniques in the business operations; Samwel (2003) viewed entrepreneurship as a function which seeks investment and production process by raising capital, arranging labour and raw materials, finding site, introducing new techniques and commodities and discovering new sources for the enterprises. Similar views were also echoed by Bolton and Thompson (2000) who have defined an entrepreneur as "a person who habitually creates and innovates to build something of recognized value around perceived opportunities". From that perspective, value addition and non-food diversification can be interpreted as an indicator of entrepreneurship assuming that these imply a shift from the traditional farm production methods to advanced systems where agro-processing becomes part of on-farm production.

2.2.4. Peter Drucker and Leibenstein's Theory of Entrepreneurship

Drucker and Leibenstein built their theories based on Schumpeter's ideas. Drucker (1909-2005) extended Schumpeter's definition of an entrepreneur as who is an initiator of meta- events. His theory pointed on innovation, resources, and an entrepreneurial behaviour as the keys to entrepreneurship. According to him entrepreneurship involves

- Increase in value or satisfaction to the customer from the resource
- Creation of new values
- Combination of existing materials or resources in a new productive combination

In one of his works Drucker (1964) noted that an entrepreneur searches for change, responds to it and exploits opportunities. Drucker (1980) coined term 'sea-change'. It is a change that is substantial in magnitude, comprehensive and pervasive in its impact on all aspects of the system affected, enduring in its influence over time, and generally rapid and discontinuous in its occurrence .Unlike Schumpeter who viewed the entrepreneur as an agent of change within the larger economy, Drucker, does not see entrepreneurs as necessarily agents of change themselves, but rather as canny and committed exploiters of change. According to Drucker (1985), "the entrepreneur always searches for change, responds to it, and exploits it as an opportunity,"

Leibenstein (1922-1994) consider entrepreneur as gap-fillers possessing the ability to combine various inputs into new innovations in order to satisfy unfulfilled market demand. Leibenstein's thoughts focus mainly on two things: suggesting a theory of entrepreneurial economics and using this theory to explain the value of entrepreneurship within the economy.

Rather than taking sides with a certain type of entrepreneurial activity, Leibenstein considers two sides, what he calls routine entrepreneurship (well-defined markets) and N-entrepreneurship (Schumpeterian-like). He introduces ways and possibilities of how both can exist within the economy, illustrating characteristics of the entrepreneur such as, risk bearer, taking ultimate responsibility, gap-filler, input-completer and the ability to evaluate economic opportunities.

Leibenstein's procedure to both theories rests upon inputs and outputs of entrepreneurship (an example of an input would be a motivational factor) and the fact that entrepreneurship is a resource, a scarce one to be specific. Since his theory describes entrepreneurship as a resource, Leibenstein implies that entrepreneurship has value in the economy in the sense that the creation and fruition of tools and technology expands the economy and its features. But he states that because entrepreneurship is not predictable, controllable, or undetermined, it becomes scarce because the "up-and-coming" entrepreneurs have a lack of input-completing capacities. Thus, in some cases a well-defined market is impossible and that is his reason for considering both routine and N-entrepreneurship.

2.2.5. Austrian and Neo-Austrian School of Thought

Knight (1921) and Kirzner (1979) cited in Pittaway and Freeman (2011), gave a different version of entrepreneurship with little connexion to the works of Schumpeter. Frank Knight (1885–1972), viewed a successful entrepreneur as an uncertainty-bearer and judgmental decision maker. Markets are always in a state of disequilibrium and Knight attempted to position the entrepreneur as the key player who is able to interpret market changes and make judgemental decisions in solving the uncertainties arising thereto.

In this theory Knight makes some important distinctions between 'risk' and 'uncertainty' that go beyond some of the earlier thinkers. If, on the one hand, change is calculable and predictable then it is a 'risk' and a person can predict with a certain degree of probability that it will occur. It can then be insured against or incorporated into the costs of doing business. If, on the other hand, change cannot be predicted then it is unknown and, therefore, uncertain. He argues that entrepreneurship rather than being a function, a role or a class of people, as in earlier theories, is in fact a type of decision that requires action in the face of unknown future events.

To be successful the entrepreneur must have the ability to forecast future changes which may have detrimental effects to the business. Consequently, entrepreneurs must assume the uncertainties brought about by evolving market trends and changing technologies making well informed decisions which bring success to the enterprise.

As a bearer of uncertainty the Knightian entrepreneur requires the following: a high degree of self-confidence, the power to judge own personal qualities as compared to those of other individuals, a disposition to act on one's own opinion, a venturesome nature, and foresight.

To address uncertainties the entrepreneur must be in possession of enough capital to pay for other factors required in the production process.

Knight's theory treats entrepreneurial ability as an outcome of personal traits, knowledge, and availability of capital all embraced under the willingness and ability to bear uncertainties.

Von Mises, (2011) also came up with a corresponding description of an entrepreneur stating that; "an entrepreneur is always a speculator who deals with the uncertain conditions of the future. His success or failure depends on the correctness of his anticipation of uncertain events. If he fails in his understanding of things to come he is doomed..."

Enter Kirzner's 'pure entrepreneur': For this entrepreneur the key determinant for success is based on the propensity to be alert to opportunities. As noted by Pittaway and Freeman (2011), it is this alertness to opportunity that defines the 'entrepreneurial' element of decision-making and, in many ways this view, brings economic thinking into the realm of recognizing the role of personal characteristics and particularly cognition. Entrepreneurship is not only the propensity to pursue goals efficiently, when the ends and means of those goals have been identified but also the drive and alertness required to identify which goals to pursue in the first place. It is the acquisition of market information and knowledge, from market participation that helps provide this alertness to opportunity.

Further to that it is also individual capacity to 'envisage' future opportunities that makes 'correct' perception of the market possible. 'Entrepreneurial' ability is dependent on perceiving future market conditions and setting about a course of action that results in a sequence of decisions directed at achieving the outcome anticipated. In his early work, which he later modifies, Kirzner defines this 'pure entrepreneur' as a "decision-maker whose entire role arises out of his alertness to hitherto unnoticed opportunities." (Kirzner, 1979). The entrepreneur is, therefore, a decision-maker who begins without any means other than an ability to predict 'successfully' changes in market conditions.

2.2.6. Entrepreneurship from a psychological perspective.

Theories seeking to describe an entrepreneur from a personality perspective can be traced back to the mid-20th century where McClelland (1955) who used the concept of the 'achievement motive' to describe the behaviour of entrepreneurs. Since then several theorists on entrepreneurship have attempted to associate other personal traits with entrepreneurial spirit however, these early theorists sought to identify a single trait and link it to a greater propensity to be a successful entrepreneur.

Rotter (1966) suggested that locus of control had a great influence on one's entrepreneurial ability, thus entrepreneurs who recorded greater success were perceived to possess a high locus of control while the unsuccessful once will be seen as having a low degree of locus of control. Rotter (1966) reasoned that; "The effects of reward or reinforcement on preceding behaviour depend in part on whether the person perceives the reward as contingent on his own behaviour or independent of it".

Individuals' displayed behaviours are in most cases determined by the degree to which the individual perceives that the reward follows from, or is contingent upon, his own behaviour or attributes versus the degree to which he feels the reward is controlled by forces outside of him and may occur independently of his own actions. Correspondingly, before demonstrating external entrepreneurship behaviours such as innovativeness, high risk taking propensity and opportunity seizing one has to first acquire an internal perception of ability or control.

2.3 Entrepreneurial Behaviour

Kumar *et al.* (2003) pronounced entrepreneurial behaviour as the aggregate upshot of information seeking behaviour, farm decision making, leadership ability, risk taking ability, innovativeness, achievement motivation and market orientation of respondent farmers. The way farmers co-ordinate their farming activities and their level of Cosmo politeness also has a reflective contribution on entrepreneurship. Narmatha *et al.*, (2002) stated that innovativeness, achievement motivation and risk orientation were the most important components. And further, decision-making, innovativeness, management orientation, economic motivation, level of aspiration and risk orientation were found to be crucial in influencing the entrepreneurial behaviour. The farmer-

entrepreneur's behaviour should always be that of looking for new opportunities, making wise decisions and applying innovative ideas towards maximising profit of the enterprise.

2.4 Characteristics of successful entrepreneurs

It is known that entrepreneurs are different from other people in terms of attitude, perspectives and some basic qualities. It is these special qualities or characteristics that draw a line between entrepreneurs and the ordinary people. In other words, some people have the ability to see the new opportunities and are more skilful to fulfil their dreams about business whereas it is almost impossible for others to get that kind of achievement (Baron, 2000). Therefore, knowing the basic qualities that differentiate entrepreneurs from others is necessary either to provide cultural transformation which will contribute to creating new entrepreneurs or to uncover entrepreneurial qualities that remained hidden in some individuals.

A lot of research works have been done by various researchers to determine the basic qualities of successful entrepreneurs; Baron (2000) explains successful entrepreneurship in terms of cognitive and social factors, stressing that successful entrepreneurs are people who strongly believe in their own judgements and they have high social perceptions and ability of successful interaction. As for Sudharani (2010) a successful entrepreneur is characterised by self-confidence, optimism, hope and perseverance. Chell *et al.*, (1991) cited by Caliendo *et al.*, (2010), explains successful entrepreneurship as the quality of seeing and using business opportunities and starting appropriate actions.

Lambing and Kuehl (2000) contemplate that an entrepreneur has qualities like self-confidence, determination, risk-management, creativity, perfectionism and tolerance against uncertainty. It is also claimed that entrepreneurship is motivated by socio-psychological factors such as helpfulness, altruism, responsibility, social justice and forgiveness. This assertion is in objection to people who claim that entrepreneurship is motivated by economic and sociobiological factors (Prince-Gibson and Schwartz, 1998).

The fact that entrepreneurship is affected by numerous factors is also related to multiple characteristics that are attributed to it. Therefore, entrepreneurship is multi-dimensional and that's why there are so many qualities to be considered when

entrepreneurship qualities are referred to. Kahan (2013:5) summarised the most frequent entrepreneurial qualities using a template presented in Figure 2.2:

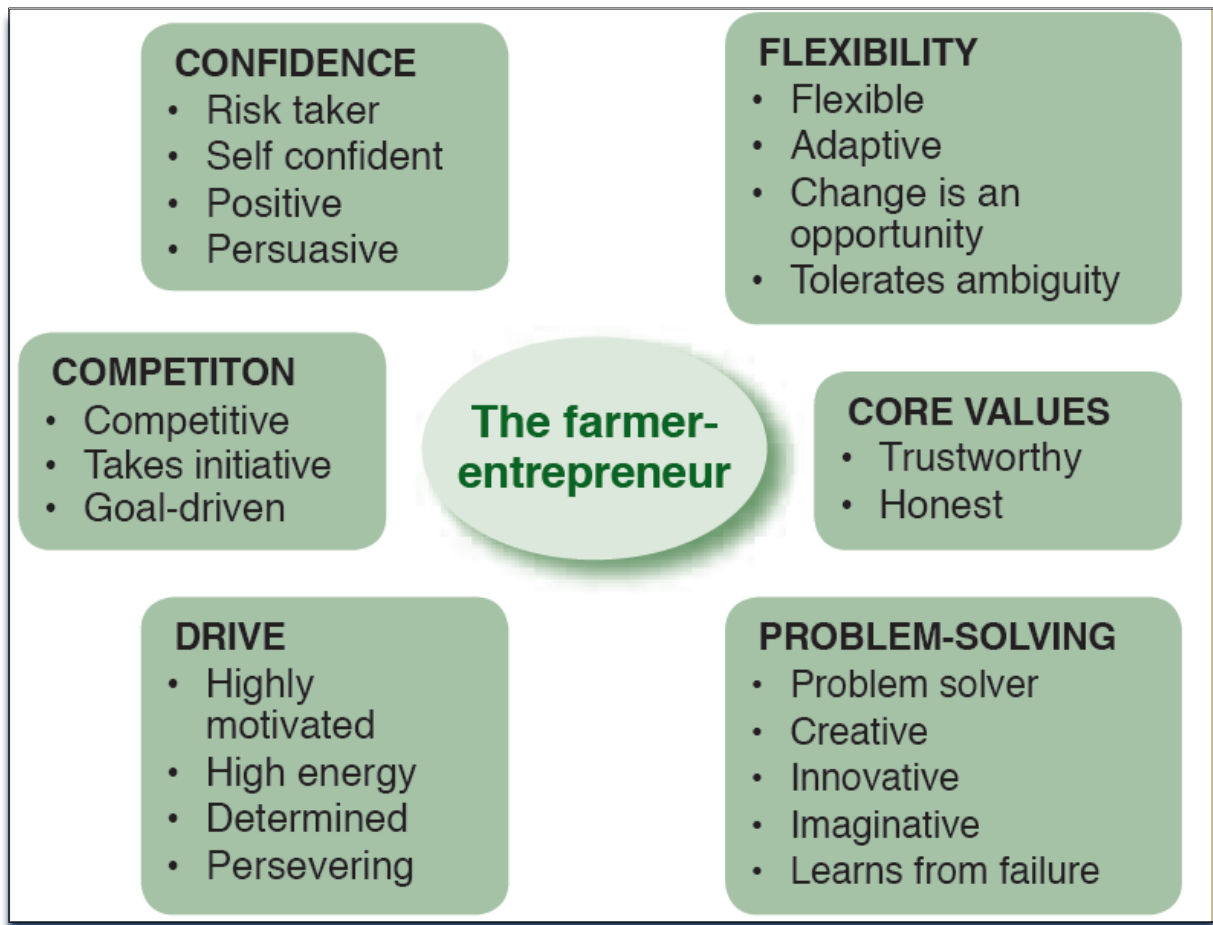


Figure 2: 2 Typical Characteristics of a successful entrepreneur

Source: Kahan, 2013

Luthans, Luthans and Luthans (2004), defined confidence as the “individual’s conviction....about his or her abilities to mobilize the motivation, cognitive resources, and courses of action needed to successfully execute a specific task within a given context” Self-confidence accelerates the development of positive feelings by increasing inner peace. Self-confident people have passion to learn and they are open to searching and criticism (Kalkan and Kaygusuz, 2012). Successful entrepreneurs use their self-confidence to choose creative and risky options for the problems and opportunities. It is known that creativity, self-confidence and optimism trigger entrepreneurs interactively. Optimism is defined as the tendency to concentrate on the positive side and see the best opportunities; however, seeing those opportunities requires asking right questions (Kümbül-Güler, 2008). The

concept of optimism is mainly based on the expectancy oriented value model which speculates that unless there is a valued goal no action occurs (Carver *et al.*, 2005). Entrepreneurs are not people who produce excuses for why something cannot be done by focusing on problems because they are opportunity oriented (Dees *et al.*, 2001).

Entrepreneurs operate in a dynamic environment filled with complexities therefore flexibility and ability to adapt to various environments are pre-requisites for success. Successful entrepreneurs take change as an opportunity rather than a challenge; they are always on the move hunting and seizing opportunities.

Core values of society such as being trustworthy and honest also play a crucial role in shaping the entrepreneur and without these core values they would not really be entrepreneurs.

Entrepreneurs are perceived to be more competitive than non-entrepreneurs; they take initiative and are goal driven. Drive goes with motivation for success. Robbins (1998) defined motivation as “the willingness to exert high levels of effort towards achieving organisational goals conditioned by the effort’s ability to satisfy individual unfulfilled need”. Motivation is thus, a trinity cycle which is either an incentive that takes the entrepreneur to a certain target or it is the behaviour which is done to reach the target and lastly it can be the process of reaching the target.

According to Johnson (1990), motivation for success is the most important factor of entrepreneurship. Individuals who have a high motivation for success have a high sense of responsibility. These individuals set targets and try to reach them and get feedback related to their performance. They do not put the blame on bad luck or external factors but take the responsibility in case of a failure. Entrepreneurs often have to face hostile environments and overcome entry barriers thus it is critical for the entrepreneur to be able to persevere and maintain hope during the initial phases of enterprise development. Innovation is also a key requirement for success. As already alluded in preceding subsections, Drucker (1985) viewed innovation as the tool or instrument used by entrepreneurs to exploit change as an opportunity. Congruently an earlier notion expressed by Schumpeter (1934) also echoes innovation to be the central characteristic of entrepreneurial behaviour.

2.5 Culture and Entrepreneurship

It is impossible to understand an individual's entrepreneurial qualities without examining cultural properties of the society in which the individual lives. Surfeits of literature concur on the nexus or causality between culture and entrepreneurship. Culture is defined as a set of shared beliefs, values and expected behaviours (Herbig, 1994; Hofstede, 1980a). Vosloo (1994) explains culture as a complex amalgam of characteristics and phenomena (which includes, belief, knowledge, art, morals, laws, custom, capabilities, habits and other ways of doing things acquired by "man" as a member of society).

Cultural and social norms are emphasized as the major strength of entrepreneurial orientation and seem to be the differentiating factor for high levels of entrepreneurial activity (Minniti & Bygrave, 2003).

Deeply embedded, unconscious, and even irrational shared values shape political institutions as well as social and technical systems, all of which simultaneously reflect and reinforce values and beliefs. Cultural values indicate the degree to which a society considers entrepreneurial behaviours, such as risk taking and independent thinking, to be desirable.

Cultures that value and reward such behaviour promote a propensity to develop and introduce radical innovation, whereas cultures that reinforce conformity, group interests, and control over the future are not likely to show risk-taking and entrepreneurial behaviour (Herbig & Miller, 1992; Herbig, 1994; Hofstede, 1980a).

Kroeber and Parsons (1958) arrived at a cross-disciplinary definition of cultures as "transmitted and created content and patterns of values, ideas and other symbolic-meaningful systems as factors in the shaping of human behaviour and the artefacts produced through behaviour". In some instances, conformity, consistency and efficacy messages that individuals get from media and personal relationships through their lives influence their intentions for being an entrepreneur while choosing their professions.

Religion as a constituent of culture has also been reported to be correlated to entrepreneurial orientation in some societies. A study by Guiso *et al.* (2003) showed that in countries where the population is more religious, there is a greater

acceptance of capitalism and, as a consequence, a more favourable environment for entrepreneurial activity. Similarly, Uhlaner *et al* (2002)'s research on the effect of cultural variables on entrepreneurial activity in 14 OECD countries and show that greater life dissatisfaction, higher church attendance and left-right extremism are correlated with higher levels of self-employment.

Family as the initial culture transmitter also teaches the child how to shape from very early ages via their class positions (Kalkan and Kaygusuz 2012). The Global Entrepreneurship Monitor (GEM) survey conducted in the Free State in 2012 revealed that family members and friends play significant roles in shaping young entrepreneurs (Turton and Herrington, 2012). Individuals from families where autonomy is granted to children at an early age are more likely to take the responsibility of their own judgments instead of following others' ideas blindly.

Earlier studies on culture and entrepreneurship have also claimed that individualistic cultures such as the ones in Europe raise more entrepreneurial individuals and as a result, economic growth is faster in those cultures as compared to collective cultures in Asia and Africa. In an article entitled "From local survivalism to foreign entrepreneurship" Charman *et al.*, (2012) portrays foreign tuck-shop shop owners as being more 'opportunity-motivated', than their fellow South African small retail business owners who continue to run business on 'survivalist' lines.

2.6 General Overview of South Africa's Agricultural Sector

The South African agricultural sector can be divided into two main sectors; the commercial sector and the small-scale subsistence sector (Obi, 2006; Agriseta, 2010; Aliber and Hart, 2009). The commercial agricultural sector is predominantly characterised by white farmers operating on a large scale, and relying on the use of modern and more sophisticated farming technology and a well-established pool of skilled and semi-skilled labour. The majority of commercial farmers engage in market-oriented production with profit making as their primary objective. Large scale commercial farmers mainly depend on irrigation for their cropping activities. Despite a notable reduction in their number from 45 818 farms registered in 2002 to 39 982 commercial farms recorded in Statistics South Africa census survey of 2007, the

primary commercial agriculture sector accounting for 95% of South Africa's marketable output, continues to be a major contributor of the country's agriculture GDP portion(Obi,2013).

On another extreme is the smallholder agriculture sector which has a limited contribution to the nation's gross domestic product. This sector is predominantly characterised by resource poor black farmers (non-white) located in rural areas in former homelands. Machete *et al* (2004) cited by (Obi 2013) points out that smallholder farmers farm exclusively for home consumption and if there is a surplus, they will sell it on the local market, but this is very rare.

Aliber *et al* (2009b) also cited by Cousins (2012), attempted to describe the typology of small-scale agriculture in South Africa stating that approximately 4 million black individuals from about 2.5 million households practise some form of farming. Their five main reasons for engaging in agriculture are: farming as a main source of food; as an extra source of food; as an extra source of income; as the main source of income; and as a leisure activity or hobby. Around 92 per cent practise agriculture as a source of food or as a leisure-time activity, and around ten percent do so as their main source of food. Only 8 per cent do so as a main or extra source of income.

In an attempt to narrow the gap between the white commercial farmers and black (mainly smallholder) farmers, the government of South Africa has made several reforms in the agricultural sector. Most of these reforms were mainly targeted at improving agricultural productivity among smallholder farmers in former Bantustans and also for the beneficiaries of the land reform programme.

2.7 South African Agricultural Policy Reforms

During the hey days of colonial South Africa, the apartheid redistributive regime was deeply focused on promoting white farmers through extended state funding, subsidies and market protectionism tendencies. These favourable conditions played a crucial role in enhancing rapid growth of the white dominated commercial agriculture. Following sanctions imposed on the apartheid government in the late 1970s and other the country's commercial agricultural sector began to underperform thus leading to huge losses for the state. In trying to reduce state expenditure in the commercial agricultural sector, the later day colonial government made fundamental

reforms aimed at creating a more open and market-oriented economy. OECD (2006) indicates that, the South African agricultural policy reforms were characterized by a reduction in state subsidies; deregulation of agricultural markets; abolishing tax concessions favouring the sector; reduced financial support, land reform and trade liberalisation among other aspects.

When the democratic government came into power in 1994 it embarked on further liberalising policy reforms which were aimed at integrating the country into the global economy and righting the wrongs of the apartheid regime. As noted by Obi (2006), the new government's agrarian policy has been more focused on integrating the previously disadvantaged black farmers into the main stream economy. Since 1994 a number of policies have been implemented with the aim of empowering and increasing the participation of black South Africans in the agricultural sector.

A number of government policies have been introduced as a way of mainstreaming black farmers into the commercial agriculture sector and indicated below are some of the programmes launched to achieve such;

a) The Agricultural Black Economic Empowerment(AGRIBEE), a sector based black economic empowerment policy launched in 2004 with the "broad" aim of providing systemic support to enhance participation of black people in the agricultural sector at various levels. Under the AGRIBEE framework , the government committed its self on transforming the agricultural sector through a number of reforms which included:

- The need to improve literacy among farm workers,
- Skills development for upcoming black farmers, and farm workers
- Establishment of mentorship programmes where white commercial farmers will offer training services to upcoming black farmers.
- Establishment of joint ventures and partnership arrangements to ensure that 30% of export market opportunities accrue to black owned enterprises by 2007
- Improve black farmers' access to support services such as access to finance, infrastructure, information and knowledge systems.

b) Comprehensive Agricultural Support Programme (CASP): like AGRIBEE, this programme was also introduced in 2004 following a survey conducted under the Intergovernmental Fiscal Review Process(IFRP) which revealed how the agricultural sector was under performing due to poor funding and lack of government support. The implementation of the CASP was guided by six pillars namely; Information and knowledge management, provision of technical support, financing, training, marketing and business development and on farm and off farm infrastructural support. Most of the support represented under the six pillars of CASP (shown in in figure 2.1) was mainly targeted for smallholder farmers in the former homelands.

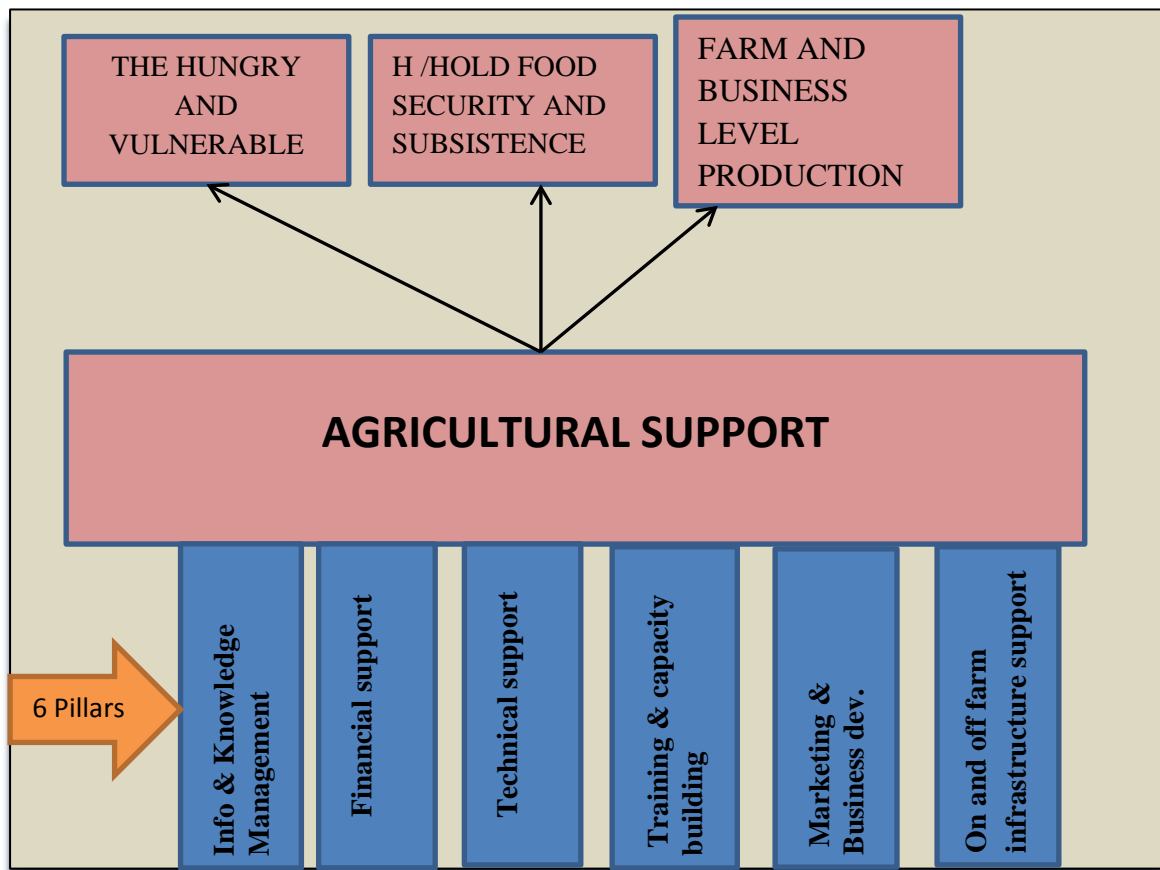


Figure 2: 3 A modified CASP model; Source Department of Agriculture (2006)

Irrigation revitalization and rehabilitation projects and the establishment of Micro Agriculture Finance Institutions of South Africa (MAFISA) are examples of some of the known outcomes of CASP. Under these programmes funding has been channelled towards smallholder irrigation schemes in former Bantustans as a way of

reviving farmers' productivity and increasing their participation in the agro-value chains.

2.8 Contribution of Agriculture In The South African Economy

Despite reports by The National Treasury, Budget Review (2010), which placed agriculture among the least contributors to the country's GDP accounting for only 2.3% of the country's gross domestic product. This figure is far below the 17% contribution recorded by the same sector during the 1950s and the 7.1% in the 1970s. A separate report by the department of agriculture forestry and fisheries (DAFF, 2013), indicating that primary agricultural sector has grown by an average of 11, 8 percent per annum since 1970, gives a positive picture on the role agriculture has continued to play in the country's economy.

The value of agricultural production in South Africa was R172 428 million in 2012, while its contribution to the GDP was approximately R58 184 million.

Figures of the 2012/13 financial year indicate that volume of agricultural production has also increased by 1, 6 percent higher than in 2011/12 with main increases mainly being noted in the animal production sector (DAFF, 2013).

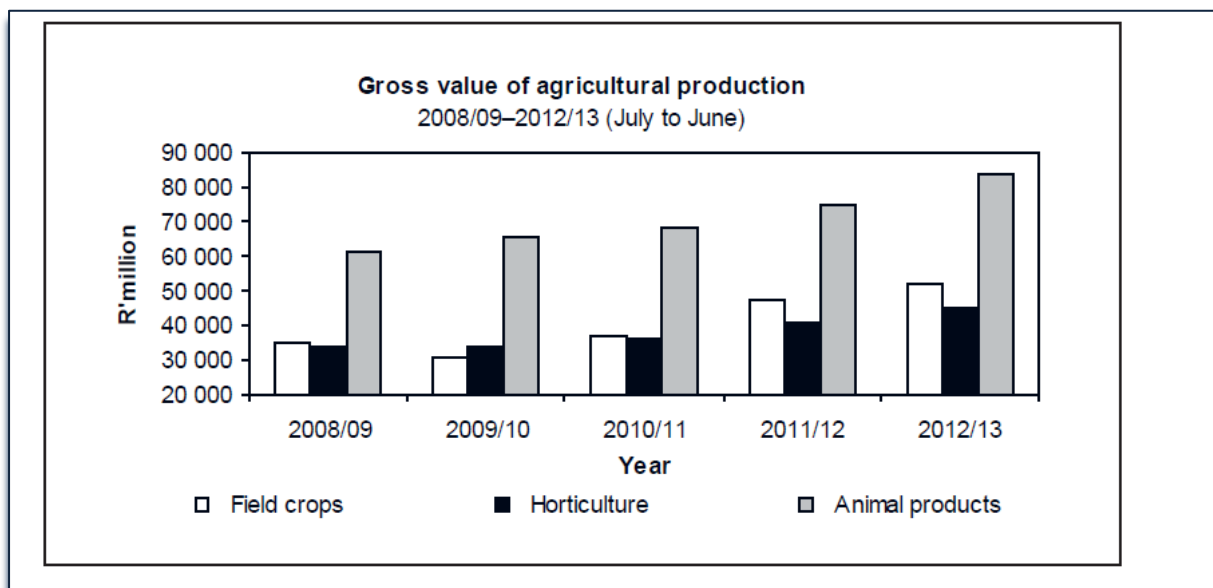


Figure 2: 4 The gross value of agricultural production from 2008-2013 Source: DAFF economic review on agriculture 2013.

As seen in Figure 2.4 the gross values of all the three commodities have been on the rise since 2008/2009 season except for a notable decline in field crops during the

2009/10 season. This is an indicator of the imperative contribution that agriculture continues to have in the South African economy.

The agricultural sector also continues to make a significant contribution in the export earnings, for example figure released by the Department of Agriculture Forestry Fisheries (DAFF, 2013) indicate a rise in the value of agricultural exports by 16,4%, from R53 898 million in 2011/12 to R62 750 million in 2012/13.

Furthermore despite a scenario in the 2007/08 financial year where agricultural imports exceeded exports thus causing a negative balance of trade (DBSA, 2009), recent trends have shown a positive situation where exports have now exceeded imports albeit the difference being less significant. According to the 2012/13 export values, citrus fruit (R7 981 million), wine (R6 965 million), maize (R5 294million), apples, pears and quinces (R5 172 million) and grapes (R4 576 million) were the most important agricultural export products (DAFF, 2013).

In a country characterised by high youth unemployment primary agriculture has remained as a strategic sector that can be used to generate the much needed jobs. Although the sector has been hard hit by job losses in the previous years, recent information indicate a rejuvenation in the number workers employed in the sector increasing by 5.3% from, 615 000 workers recorded in 2009 to 650 000 workers in 2010(AGRISETA , 2010).

Coming to smallholder agriculture, since early days of independence the South African government has always viewed this sector as a key node in transforming the rural economy which played home to 70 percent of the country's poor (Government of South Africa. 1995). Though the smallholder sector has not been viewed as a key player in the national economic transformation its main concentration in the rural areas means that the section remains strategic in eradication of rural poverty and creating employment. Improving agricultural productivity, particularly smallholder agricultural productivity, remains crucial for the eradication of rural poverty (Machete *et al.*, 2004). Carter and May (1997) also identify agricultural production as one of the most important sources of income for rural households in South Africa though Alber(2009b)'s findings putting the number of rural households depending on agriculture as a source of income at eight percent gives a contrary picture on the role played by agriculture on rural livelihoods.

In recognition of the role played by the smallholder agricultural sector, the NPC (2011) has thrown its weight on the importance of an agricultural based rural economy transformation strategy. In its working document; National Development Plan (NDP) vision 2030, the NPC identifies agriculture as a key element towards transformation of the country's rural economy through employment creation, improved food security and poverty alleviation. Some of the NDP proposed agricultural transformation strategies include the following;

- Expansion of irrigated agricultural land by 500 000 hectares from the current 1.5 million hectares
- Convert underutilised communal land and land given to land reform beneficiaries into more productive commercial projects.
- Pick and support commercial agriculture sectors and areas that have a great potential for growth employment creation.

2.9 Water and agricultural productivity

Nearly 70% of the world's water use is devoted to agricultural production and the majority of this water is used for irrigation (Disrude and Grossman, 2004). Considering that, irrigation accounts for more than 40% of the world's production on less than 20% of the cultivated land (UNWWD, 2012), the role of irrigated agriculture to global food security cannot be underestimated.

Irrigation brings a range of potential changes in agricultural production. Research undertaken by Lipton *et al.*, (2003) revealed that the first direct impact is on output levels. Irrigation boosts total farm output and hence, with unchanged prices, raises farm incomes. Increased output levels may arise from any of at least three reasons inter alia; 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 rainfed production is impossible or marginal. Hence irrigation is likely to boost output levels. Finally, output may be increased because irrigation enables the use of complimentary inputs, such as high yielding varieties (HYVs).With irrigation the effects of fertilizers on the yields of new or existing crop varieties are enhanced and multiple farm enterprises with livestock, crops and agro-processing can be

developed. An econometric study conducted by Dillon (2011) articulated that, irrigation technology causes a shift of cropping patterns in favour of high value of cash crops, culminating in increased value of crop production, greater investment in farm equipment and durable assets with overall positive impact on socio economic status of the smallholders. An almost similar trend has been noted by Gebreselassie and Ludi (2010) who indicated that the introduction of irrigation schemes led to a significant improvement in the commercialisation of smallholders in Ethiopia.

Increased productivity also means an improved food security at household, community and the national level at large. In a comparative study on food security situation of dry land and irrigation farmers in the Limpopo province, Oni *et al* (2011) revealed that the proportion of food secured households was higher among farmers who were on the irrigation projects (86.3%) than those on dry-land farming (53.0%). Increase in food production also results in low food prices making it easier for low income households to afford enough food and fight malnutrition. Rosegrant, (1995) credits the low global food prices experienced from the late 1980s up to 1995 to the irrigation boom and other green revolution policies.

In a survey to assess the impact of irrigation on food security in Swaziland, Peter (2011), concluded that income gained through shares on sugar cane irrigation schemes played a significant role in purchasing household food.

Enormous contributions of irrigated agriculture in creation of rural employment have also been cited by several authors (Smith, 2004; Chambers 1988; Lipton *et al* 2003). Irrigation projects firstly require labour during the construction phase and for on-going maintenance of canals, wells and pumps etc. This is likely to be an important sector of employment for the poor, especially the landless rural poor or rural households with excess labour or seasonal excess labour. A project in Nepal that used labour-intensive construction to provide irrigation increased production potential by over 300% and income by over 600%, contributing immensely to food security (Kay,2001).

Secondly, increased farm output as a result of irrigation will stimulate demand for farm labour both within the main cropping season and across new cropping seasons, increasing both numbers of workers required and length of employment period. Rural poverty levels may therefore be reduced by increased employment opportunities. In

addition there may be spill over effects that extend to other areas. For instance, if irrigation projects reduce migration to urban areas, and so will the pool of urban job-seekers thus consequentially reduces over urbanisation and the challenges arising henceforth.

Smith (2004) stressed the positive impact that creation of rural employment through irrigation has on improved wage rates and reduced out-migration and increased return migration. Chambers (1988) cites several empirical studies across countries that show that irrigation directly raises employment for landless labourers via increase in days worked per hectare, increase in days worked during a cropping season, and additional employment in a second or third irrigation season.

2.10 Smallholder irrigation in South Africa

South Africa's smallholder irrigation sector comprises 50 000 to 100 000 hectares of arable land (Machete *et al.*, 2004). This area covers five to eight percent of the total irrigated area (Backeberg and Odendaal, 1998). Despite this small proportion, smallholder irrigation is considered to be an important component of the government's rural development strategy (Ministry of Agriculture and Land Affairs, 1998).

In order to describe the smallholder irrigation sector, one needs to have a good understanding of who the smallholder farmer is. The term 'smallholder' is widely used on the assumption that there is a common understanding of what it means. Despite widespread reference to smallholder farming in agricultural and rural development literature, few analysts attempt to define or describe the smallholder farmer. The term smallholder farmer is used in reference to those small scale farmers who are usually resource poor, having access to small sized land portions and mainly engaged in subsistence farming. Terms used to describe smallholder farmers include small-scale farmers, resource-poor farmers, peasant farmers, food-deficit farmers, household food security farmers, land-reform beneficiaries and emerging farmers (Machete *et al.*, 2004).

In 1992, the Water research commission (WRC) commissioned a second study aimed at providing a comprehensive overview of smallholder irrigation in South Africa. This investigation, conducted by De Lange (1994), indicated that there were probably about 150 000 Black irrigators in the country, comprising 3 broad groups, namely:

- Independent irrigation farmers who privately accessed and applied water to their farms
- Community gardeners
- Plot-holders on smallholder irrigation schemes

2.10.1 Independent irrigation farmers

Independent irrigation farmers are those not participating in an irrigation scheme or in a gardening group. Independent farmers have a "private" water supply, such as pumping directly from a river, or an own borehole. Independent farmers are often bona fide farmers, aiming to make a living out of farming. Others consider farming as an additional source of income. Independent farmers usually start their irrigation enterprises using own or family capital and built it up over a period. These enterprises range from the very small vegetable or fruit tree plot, to fairly large commercial units, e.g. 100 ha intensive tomato cultivation under sophisticated drip irrigation. There is virtually a paucity of information on independent farmers, as they are not being financed or managed by formal institutions though the "independent farmer" sector probably forms a significant component of small scale irrigation farming in South Africa (van Averbek, 2008).

2.10.2 Community gardeners

Small- and micro-scale vegetable farming represents a significant and important sector of irrigation farming in rural and urban areas. It is estimated that at least 150 000 growers participate on community gardening projects in South Africa and an unknown number grow food in home gardens. Community gardens are similar to irrigation schemes in that a group of farmers shares infrastructure for water supply. These "irrigated food plots" constitute one of the biggest success stories in

agricultural development in South Africa. Their success is in sharp contrast to the problems of many of the sophisticated top-down managed larger irrigation schemes. Community gardening provides individuals with the opportunity to develop virtually a full range of entrepreneurial and farming skills on a small enterprise, as growers have autonomy in decision-making on cultivation and marketing, yet have to cooperate in an organisational structure around shared water supply, infrastructure and equipment. Community gardening is unique in the opportunity it can provide the poorest of poor people to improve their standard of living. Community garden participants are mostly women.

2.10.3 Irrigation scheme farmers

An irrigation scheme can be defined as an agricultural project involving multiple holdings that depend on a shared distribution system for access to irrigation water and, in some cases, on a shared water storage or diversion facility. Plot holders on irrigation schemes operate as individual entities or cooperative groups. South African SIS can be defined as multi-farmer irrigation projects larger than 5 ha in size that were established in the former homelands or in the resource poor areas by black people or agencies assisting their development Van Averbeke, (2008).

Denson and Manona(2007;5) tried to distinguish the differences between plot holders and farmers, pointing out that on many schemes the majority of those who have rights to plots, primarily through PTOs (Permission to Occupy) or in some cases quitrent or long-term lease are not engaged in farming activities. They defined plot-holders as “those people who have legal right to use the land either through entrenched traditional rights (PTO) and on occasion quitrent or title (ibid; 5). On another hand, farmers are considered to be those people who are actively engaged in the farming enterprise through investment or direct labour and make the decisions related to crop production and marketing(ibid;5).

2.10.4 Home gardeners

This is the fourth group of smallholder irrigation farmers identified by Du Plessis *et al.*, (2002),describing them as back yard or home garden irrigators who watered small portions of crops on parts of their residential sites. In most instances home gardeners own small food plots of less than 0.5 hectares where their core purpose is

subsistence food production, that is, enough for home consumption and sometimes supplemented by output market purchases (Hajdu *et al*, 2012).The homestead food gardens produce diversified crops which include high value vegetables such as tomatoes, cabbage , and grain crops like maize as well as legumes (Obi,2013).Due to their closeness to the farmers' homes ,homesteads gardens tend to get more attention as compared to fields that are far away thus giving them a higher chance of success.

2.11 Antecedents of Smallholder irrigation schemes under pre and post homeland era.

The need to invest in smallholder irrigation has a long history stretching from the colonial times to the present day democratic South Africa. Following the findings and recommendations of the Tomlinson Commission of 1955, the colonial government initiated the establishment of smallholder irrigation schemes for black South Africans with the aim of improving food security and alleviating poverty. The establishment of state sponsored irrigation schemes in the former homelands of the Eastern Cape began in the late 1960s and continued through to the late 1970s (Vaughan, 1997:2). Farmers were allocated plots ranging from 0.5 hectares to 10 hectares. Operations most schemes were largely controlled by state sponsored parastatal companies and this reduced farmers into mere labourers on their own plots. Farmers' participation in the crucial activities involving the management of their plots and making decisions on the type of crops to grow was non-existent. The parastatal also organized the marketing of pooled produce, deducting all its expenses and handing over the residual sum to the farmers Shah *et al.*, (2002).This arrangement thwarted the farmers entrepreneurial spirit and created a culture of dependency among the farmers and consequently when the state's direct financial support was eventually terminated, most of the irrigation schemes became moribund and remained inactive for many years because the farmers could not finance their farming operations as they were neither viable nor sustainable (Crosby, 2000:6).

Available evidence from (Van Averbek *et al.*, 2011) indicates that of the country's 302 smallholder irrigation schemes, 101 or 33% of the schemes were non-operational, with Limpopo and Eastern Cape Province having the highest proportion of defunct schemes respectively. Corresponding observations were also made by

Denson and Manona (2007). Table 2.1 presents the existing statics regarding the operational status of smallholder irrigation schemes in South Africa.

Table 2: 1 Operational status of smallholder irrigation schemes in South Africa

Province			
	Operational irrigation schemes	Non-operational irrigation scheme	Total number of irrigation schemes
Limpopo	101	69	170
Eastern Cape	50	17	72
Mpumalanga	7	12	19
North west	2	0	2
KwaZulu- Natal	35	0	36
Free state	1	1	2
Northen Cape	2	1	3
Western cape	7	1	8
	185	101	302

Data source: Van-Averbeke *et al.*, (2011)

Though a high percentage of smallholder irrigation schemes can be categorized as operational, most of these schemes are not intensively utilized and in most cases yields are far below expected standards. A visit on Qamata irrigation scheme established in the late 1960s under the Transkei homeland government shows a large number of defunct agro processing infrastructures a clear picture of an agricultural revolution that went wrong. Such observations have also been made elsewhere, (Denson and Manona 2007: Obi, 2013) reported a widespread underperformance of smallholder irrigation schemes located in former homeland areas.

Albeit showing a seemingly successful take-off period, most schemes always seem to take the same trend of declining yields, diminishing returns and loss of profitability in the long run. The gloomy picture that prevails in most smallholder irrigation scheme is always in contrary to the jubilant atmosphere that often characterises the officiating gatherings on such schemes.

In attempts to resuscitate the state of irrigation smallholder irrigation schemes in former homelands the post 1994 South African government has implemented a number of revitalisation and rehabilitation programmes but the outcomes seems not

match with the level of investment. As noted by Bembridge (1999) this poor performance was associated with a range of factors, including poor maintenance of infrastructure and equipment; high energy costs where pumping was involved; lack of institutional support in terms of credit; marketing and tract power; lack of extension and farmer training; conflict; and weak local organisation. Several other authors (Fanadzo *et al.*, 2010; Van Averbeke *et al.*, 2011; Fanadzo, 2012) have also indicated the existence of a nexus of causality between low irrigation performance and factors echoed by Bembridge (1999).

On this backdrop researchers have made recommendations that the main focus area for improved smallholder irrigation schemes should be on implementing a multifaceted revitalisation approach aimed at creating profitable agri-business on existing schemes and in the communities surrounding schemes. Human capital development both individually and organisationally, empowerment, access to information, marketing and business strategy development are emphasised alongside repair and re-design of existing infrastructure (Denson and Manona 2007). Advocating for a multi-dimensional approach in addressing the problems faced by smallholder irrigation schemes, Denison and Manona (2007) wrote: "Experience is clear that infrastructure development alone as a dominant part of the intervention (revitalisation) is highly unlikely to succeed.

Farmers in smallholder schemes need support that go far beyond just the irrigation system if they are to improve their livelihood significantly. Narrow sectorally isolated engineering and infrastructure driven programs have substantially increased risk of failure. The interventions that are based on comprehensive strategies addressing the complex of activities that make up the irrigation enterprise are most likely to succeed. These include markets, finance, inputs, infrastructure, institution building and crop production information." In this regard the component of entrepreneurship which implies farmers taking their farming enterprises as sources of income, providing a pathway out of rural poverty also needs to be addressed.

2.12 Role of entrepreneurship in South Africa's rural economy.

The scope of economic progress of a nation depends upon its level of innovation which in turn depends on rate of increase in the entrepreneurial talent in the population. The entrepreneurs are key persons of any country with a responsibility of

promoting economic growth and technological change. The appearance of their activities, i.e. the development of entrepreneurship is directly related to the socio-economic development of the society. Of late there has been an increased interest in the subject of entrepreneurship among scholars, private institutions and national governments across the world.

Entrepreneurship is seen as an indispensable element for economic advancement, exhibiting its ultimate importance in different ways: it leads to the creating new firms and/or renewing existing ones by making them more dynamic and acting as a force in that drives driving the economy forward through ; innovation, competence, job creation thus impacting on the overall wellbeing of society.

In the South African context where over 70% of the nation's poor people reside in rural areas, entrepreneurship can help uplift the livelihoods of the country's rural poor who are predominantly black. Rural entrepreneurship will bring in or develop infrastructural facilities like power, roads, bridges etc. It can help to check the migration of people from rural to urban areas in search of jobs. The growth of rural entrepreneurship can reduce the social evils like poverty, growth of slums, pollution in cities and crime rate.

The South African government's National Development Plan policy document also cites the importance of labour intensive rural entrepreneurship as a clear solution to the growing problem of unemployment (NPC, 2011; 201). Development of industrial units in rural areas through rural entrepreneurship has high potential for employment generation and income creation. Promotion of rural entrepreneurship can also be a key for the empowerment vulnerable groups such as women, youth and the disabled.

2.13 South Africa's entrepreneurship performance

Entrepreneurship is vitally important to the economic and social development of South Africa. Through innovation, entrepreneurs create new, competitive markets and businesses which lead to job creation and have a multiplying effect on the economy. The GEM 2004 report reiterates the importance of entrepreneurship

stating that “New business creation is fundamental to the growth of the South African economy and to our future socio-political stability. Education and experience are key elements in successful venture creation”.

Entrepreneurship empowers citizens and is required for any emerging market to move forward and successfully integrate into the global economy. Entrepreneurship is a vital yet poorly understood ingredient in national economic growth and development (Orford *et al* 2004).

With the aim of assessing countries in terms of their entrepreneurial activity and promote entrepreneurship across the globe, the London Business School and Babson College established the Global Entrepreneurship Monitor (GEM) in 1999. GEM follows the World Economic Forum (WEF)'s country classifications grouping participating countries into three economic categories namely: factor-driven, efficiency-driven or innovation-driven economies.

Factor driven countries are characterised by low levels of economic development and a large agricultural sector, which provides subsistence for the majority of the population who mostly reside in the rural areas (Turton and Herrington, 2012). As industrialisation increases the economy changes from agriculture to extractive and emergent scale-intensive sectors leading to a rapid rural –urban migration. Consequently there is an oversupply of labour in urban areas with the surplus job seekers ending up being forced into self-employment (necessity based entrepreneurship) to earn a living. Basic requirements such as infrastructure, health and primary education are the main focus of factor driven countries. As shown in Table 2.2, eighty percent of the 10 countries from Sub-Saharan Africa which participated in the GEM survey conducted in 2012 are found in this category.

Efficiency driven economies act as a transition between factor driven and innovation driven economies. They are characterised by an expanding scale intensive industrial sector supported by favourable national policies. Large national businesses and medium sized manufacturing sectors are a common feature in efficiency driven economies. The focus for efficiency-driven countries tends to be on higher education and training; goods market efficiency, labour market efficiency, financial market

sophistication, technological readiness. This group is mainly dominated by countries from Latin-America and the Caribbean with South Africa and Namibia being the only two countries from sub-Saharan Africa in this category.

Innovation-driven economies is characterised by a mature economy and an increasingly affluent population. The industrial sector evolves and experiences improvements in variety and sophistication. More attention is directed on research and development which opens a way for the development of innovative, opportunity-seeking entrepreneurial activity. Some of countries in this group include United States of America, Japan and the majority of countries from the European Union. None of the countries from sub Saharan Africa is found in this category. Table 2.2 presents information on the categorisation of countries based on their observed level of economic development.

Table 2: 2 GEM for countries by geographic region and economic development level

Region	Factor-driven economies	Efficiency-driven Economies	Innovation-driven Economies
Latin-America & Caribbean		Argentina, Barbados, Brazil, Chile, Colombia, Costa Rica, Ecuador, El Salvador, Mexico, Panama, Peru, Trinidad & Tobago, Uruguay	
Middle East & North Africa	Algeria, Egypt, Iran,	Tunisia	Israel
Sub-Saharan Africa	Angola, Botswana, Ethiopia, Ghana, Malawi, Nigeria, Uganda, Zambia	Namibia, South Africa	
Asia Pacific & South Asia	Pakistan	China, Malaysia, Thailand	Japan, Republic of Korea, Singapore, Taiwan
European Union		Estonia, Hungary, Latvia, Lithuania, Poland, Romania	Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Portugal, Slovakia, Slovenia, Spain, Sweden, United Kingdom
Non-European Union		Bosnia and Herzegovina, Croatia, Macedonia, Russia, Turkey	Norway, Switzerland
USA			USA

Source: GEM Global 2012 Report

Despite being classified as an efficiency driven economy, South Africa's second economy which is predominantly composed of resource poor households can be categorised among factor-driven economies (GEM, 2011).

Previous GEM reports have portrayed South Africa's entrepreneurial activity as lagging behind when compared to the majority of participating countries (Orford et al 2004; GEM 2011; Turton and Herrington, 2012). In their 2012 GEM report, Turton and Herrington (2012; 18) cite South Africa as the least performing Sub Saharan country in four of the five the entrepreneurial activity indicators measured under GEM's Total Early Stage Entrepreneurial Activity (TEA) index. According to Turton and Herrington, (2012), the country's TEA rate decreased from the 9.1% recorded in 2011 to 7.3% in 2012. These entrepreneurial indices are far below the average of 14.3% recorded for efficiency-driven economies in 2012.

In their 2006 South African GEM report (Herrington and Maas, 2006) outlined the following key factors that contribute to low entrepreneurial activity in South Africa:

- An education system does not encourage entrepreneurship as a career – it is seen as something you do when you cannot find a job or do not have a profession.
- Lack of resources needed to start one's own business - banks want too much security.
- Ill-disposed regulations that create huge administrative burdens and high costs when starting a business.
- Sanctions in the past and a colonial education system that did not encourage entrepreneurship.
- Prohibitive culture or societal values which influence children to believe that it is better to find a job and be safe.
- An unsupportive society which has a harsh attitude towards failure, which inhibits many potential entrepreneurs.
- Limited infrastructure and lack necessary skills required for the development of entrepreneurship

- A paradigm of entrepreneurship does not exist. With the majority of the population expecting that big business, government and others should create jobs, rather than that one can create one's own employment.
- Lack of competency in areas of business management skills amongst entrepreneurs.

Having noted weak entrepreneurial performance demonstrated by South Africa and the causal factors thereto the country's Global Entrepreneurship Monitoring team has outlined several areas that need to be addressed to rectify this challenge.

Some of the recommended strategies are as follows:

- The provision of clear definitions for key concepts such as political and economic development, poverty alleviation and economic development.
- Entrepreneurship should be developed from an early age through the education system. The right skills for modern entrepreneurship should be developed.
- Access to cheaper and different funding models must be developed i.e. quasi-funding, grants.
- Corruption and nepotism must be ruled out by the politically powerful.
- Integrated support services such as training, research and consulting must be developed and implemented.
- Access to venture capital must be improved. Service delivery on various government levels must improve drastically.
- Policy conflicts should be highlighted and solved between government departments.
- Different support measurements should exist for the development of different entrepreneurial groups, e. g .necessity and opportunity entrepreneurial groups.
- Turton and Herrington, (2012) also noted the need to address the unacceptably high levels of violent crimes which are affecting all business, from micro-enterprises to large corporations.

To date the government of South Africa has shown an increased commitment in improving the level entrepreneurship with a specially attention being given to black South Africans through its Broad Based Black Economic Empowerment programme.

The National Development Plan (NDP) which is a government's policy document emphasizes the need to focus on promoting an enabling entrepreneurial environment for Small and Medium Enterprises (NPC, 2011).

2.14 A review of entrepreneurship differences between South African smallholder a farmers and Commercial white farmers (a historical perspective)

The thinking that has been championed by groups that are sceptical on the need for land redistribution is that white commercial farmers are more "profit driven" than their smallholder counterparts, and thus farming should be left in the hands of a few capable farmers who have the capacity and will to feed the nation. As already alluded in preceding subsections, the large proportion of the agricultural sector's contribution to the GDP is attributed to the predominantly white controlled commercial agricultural sector. A review of the agricultural related policies and institutional arrangements pre-existing from the colonial can provide an answer to the perpetual discrepancies between the smallholder and commercial farmers.

The laws passed in these periods more specifically the draconian Land act of 1913 caused the de-agrarianisation of the rural areas where African people were pushed from their land and thus somehow robbed of their means of livelihoods that was until then based on agriculture. "Overall, what had been a largely agrarian society become something else"(Seeking and Natrass, 2005). Having lost their land black people migrated to urban areas and mines with a hope of earning a living, and this to some extent proved to provide a solution to the landless black people who now gained income as wage labourers. Those who could not find work in the cities resorted to self-employment involved in some informal entrepreneurial activities (Illife, 1987). Enter apartheid; having won the elections in 1948, the National Party introduced harsh discriminatory laws which saw the establishment of anti-urban influx regulations and the establishment of homelands. The majority of the land less and "unemployed" black people were deported from urban areas to un-productive and homeland reserves. As noted by Illife (1987), the apartheid government policies led to the banishment of informal African trading business which was until then flourishing in urban townships. Marginalised in congested homeland areas, black

people were reduced to paupers waiting in vain for employment opportunities to arise in the cities.

Conversely, while the dogma of apartheid led to the de-agrarianisation of the rural areas, on the other side these policies created a favourable environment for the growth of white commercial agriculture. With heavy support from the state, white commercial farmers expanded and became more 'entrepreneurial', while black farmers became worse off. A typical example of how apartheid policies disenfranchised black farmer entrepreneurs is Van Onselen (1997)'s story of Kas Maine (1894-1985) a successful black sharecropper prior to apartheid who experienced a rapid decline into poverty curtesy of the callous agricultural laws which disbanded sharecropping and forced them to reduce their livestock numbers.

Though colonial policies have had a negative impact on the evolution of black farmer entrepreneurship, the efforts which have been taken to promote the country's black farmers from homeland irrigation schemes era to the current epoch seems not to have brought any positive transformation. This then pushes for the need to look at other possible factors posing impedance on entrepreneurial development among smallholder farmers.

2.15 Promotion of Entrepreneurship in smallholder agricultural sector.

Contrary to development based on bringing in human capital and investment from outside, promotion of entrepreneurship among smallholder farmers is a major step towards the development of rural economies. Transforming small rural farm holdings into viable enterprises will lead to employment creation, poverty reduction and advancement of the rural and national economy.

The foundation of success in entrepreneurial development starts at national level, with the formulation of policies and programmes focusing more specifically on the development and channelling of entrepreneurial talent in the farming sector. Support like the provision of information on quality standards, and input and output markets in the agricultural sector coupled with capacity building services such as business planning, marketing, record keeping and post-harvest handling of agricultural goods may be of great importance in promoting entrepreneurship (Obi, 2013).

Increased access to agricultural loans/credit at low interest rates coupled with long payback periods can also speed up the entrepreneurial drive among small holder farmers. Conditions needed to boost entrepreneurial growth, may call for more agricultural linked activities such as agro processing produce units (maize mills, decortication mills); agro-produce manufacturing units, and agro-input manufacturing plants. Post-harvest processing represents a value-adding possibility in which entrepreneurial farmers can become involved to capture value within the value chain (Kahan 2013). Access to improved seed and fertiliser and agro services and work shop centres are also essential for entrepreneurial growth (Sudharani, 2010; Obi, 2013).

Furthermore provision of farm extension services has also been noted as a major step in promoting entrepreneurship among smallholder farmers. A study by Nagesh, (2006) among pomegranate farmers in Bagalkot district of Karnataka, India, revealed that extension participation of farmers was positively and significantly correlated with their entrepreneurial behaviour. Extension participation helps the farmers to get information from various sources improving their knowledge on improved agricultural practices. In the same survey, farmers with a greater access to extension also adopted new agricultural technologies earlier than fellow farmers with little extension participation. Extension efforts need to be directed towards developing the skills and strengthening the capabilities of small-scale farmers to become more competitive and profitable (Kahan, 2013:3).

Multidisciplinary training aimed at empowering smallholder farmers with both production and entrepreneurial skills is also crucial. Training is essential for the development of entrepreneurs. It enables the rural entrepreneurs to undertake the venture successfully as it imparts required skills to run the enterprise. Results of a survey conducted by Chaudhari *et al.*,(2010), to compare entrepreneurial behaviour between trained and untrained dairy farmers in the India showed that more than half of trained dairy farmers (58.00%) had medium level of entrepreneurial behaviour, followed by high level (26.00%) and low level (16.00%) of entrepreneurial behaviour. Whereas, nearly half of untrained dairy farmers (49.00%) had low

entrepreneurial behaviour, followed by medium (40.00%), while meagre per cent of untrained dairy farmers (11.00%) belonged to high entrepreneurial behaviour.

Other researchers have found comparable results; Carter (2003) found that better-trained farm owners show more diversified business activities, are more likely to have a positive attitude towards new market opportunities, a good appreciation of and sensitivity to customer needs, and are more willing to engage in new ventures. McElwee (2008b) also agrees with the need for training, stressing that, developing entrepreneurial competency in the agricultural sector means bringing the farmer from the 'farmer as farmer' position to the 'farmer as entrepreneur' level through an educational process.

2.16 Barriers to Entrepreneurship in smallholder farming

It cannot be assumed that every enterprise will be successful. It needs the right environment. Likewise, farming is not a homogeneous sector; farmers operate in a complex, multi-faceted environment which is tightly constrained and regulated. This environment acts as a significant barrier to entrepreneurial activity (Carter, 2003; McElwee, 2008). This environment is affected by government policy and the level of investment in agriculture. As cited by Kahan (2013), entrepreneurial development of farmers is constrained by various factors some of which are described in the following subsections;

2.16.1 Poor or absent infrastructure:

The remoteness of many rural places presents transportation challenges to small businesses; because the population is widely scattered (Barkema and Drabescott, 2000) and distances to large national markets may be a challenge. In some countries, distances between nodes in sparsely populated regions, or between rural and urban areas, aggravates the effect of terrain and harsh climatic conditions. Infrastructure is particularly important in this context, as it affects the ability of a region to retain and attract people as well as businesses (OECD, 2006a). In South African rural farming set up, often, what is blocking starting and growing profitable

farm businesses is the absence of basic infrastructure. Simple things, such as poor roads leading to markets, inadequate storage and market facilities, and in some instances irregular supplies of electricity create very real and practical barriers to developing farm businesses. A survey conducted by Ngorora and Mago (2013), for instance showed that entrepreneurs who were involved in the marketing of fresh produce in Nkonkobe district experienced huge losses due to lack of proper storage facilities.

2.16.2 Unsupportive laws and regulations

In their article published in the journal of entrepreneurship Pirchado *et al.*, (2012), stresses that paternalistic attitudes of the government towards the agricultural sector inhibits the emergence of entrepreneurial attitudes and behaviours in Irrigation Units. Governments need to have a positive view of entrepreneurship in farming. Land tenure and ownership, banking laws, trading regulations, business law and tax law are some of the more common barriers that help or limit the development of successful farm businesses. The ability to buy, sell and hire land, the legal status of women, the complexity of business regulations and the extent of bureaucratic procedures, all affect the environment in which new farm businesses must operate. Countries therefore need to look very carefully at laws and regulations to make sure that they make it easier for small-scale farmers to develop their farm businesses.

2.16.3 Lack of financial support

Getting smallholder agriculture moving requires that financial support services be accessible to the majority of smallholder farmers. Paucity of funds stands as major stumbling block for many smallholder farmers wishing to expand production or diversify into new high value enterprises (Kahan, 2013). Furthermore, farmers who are starting new enterprises often face difficulties in accessing information on reliable sources of finance (Machete,2004) . In cases where farmers are aware of reliable credit sources, they often cannot get credit because they lack the required collateral (because they have few assets), they have no credit history and their incomes are too low. Baloyi (2010) highlighted how the lack of collateral has hindered poor smallholder farmers in Limpopo from accessing credit offered by commercial banks.

2.16.4 Social barriers

There are also social barriers to entrepreneurship that are encountered by farmers. As indicated by Kahan (2013), the concept of entrepreneurship is not common to every culture or society. Some countries have social systems that create dependence and hopelessness (Verheul *et al.*,2001). Women in business are often not supported or are even discouraged. In some cultures communal enterprises may be more acceptable than individual businesses. Extension workers will need to be aware of these social barriers and help farmers deal with them.

2.16.5 Lack of training facilities

To have a healthy farming sector, training facilities and support must be easily available to farmers. Most training institutions are located in urban areas far from rural communities; this arrangement tends to consolidate the high levels of illiteracy in rural areas thus making it more difficult to access skilled labour. Freshwater (2000) characterised the rural labour force in terms of lower levels of educational attainment and formal skills than those found in urban areas. Effective institutions need to be developed to provide education and training at the right time, in the right place, and with the right balance of technical knowledge and practical skills.

2.16.6 Lack of support services and trained extension staff

Farmers advancing through the various stages of development will need information, advice and support. Services are needed to provide advice and support to farmers in identifying, preparing, designing and implementing efficient farm businesses. Advice and support to farmers must cover areas beyond the traditional production-led services. The support needs of farmers are much wider – covering all aspects of running a profitable, market oriented farm business. In many countries, there is a general lack of farm management advisors to deal with the range of issues and questions faced by farmer-entrepreneurs (Swanson,2005). Further, support services are often inadequate and inefficient, particularly in remote rural areas. Machete *et al.*, (2004) indicated that most of the government's extension personnel operating in rural areas were inadequately trained in the technical subject matter and educational

process skills thus undermining their confidence, credibility and ultimately their performance.

2.16.7 Marketing constraints

When running a farm business, production must always be linked to a market. Access to markets is often constrained by a number of factors. These include poor communications, infrastructure and marketing facilities, lack of reliable and timely market information, limited purchasing power and even negative attitudes of buyers. Van der Stoep (2006) noted that most smallholder irrigation farmers rely on middlemen for marketing their produce. Middlemen often exploit and cheat rural entrepreneurs, buying produce from farmers at very low prices and getting the lion's share of the profits.

Most smallholder farmers are located in the countryside where they solely rely on information from their local extension officers. In most instances information provided through extension and support services (including NGOs) mainly focuses on production technologies, and not on prices, contacts, market possibilities or business management (Kahan ,2013).

2.16.8 Land tenure system

The form of land ownership has a contributory effect on the level investment and development channelled by farmers on their land. In situations where land is owned under private tenure farmers who are in this case landlords (possessing titled deeds) tend to invest more on upgrading their land with the aim of increasing the land's value. Almost all smallholder irrigation schemes in the Eastern Cape Province have a traditional land tenure system in which the Traditional Authority (TA) has official ownership of the land. Certificates with a "Permission To Occupy" (PTO) are issued to the users of the land. Mostly the PTO can be inherited but it is not allowed or possible to sell this right of usufruct.

Bembridge (2000) noted that insecure tenure characterising most smallholder irrigation schemes in former homelands tends to limit farmer incentives in making

long-term development investments on their land. Without title deeds, farmers on smallholder irrigation schemes cannot use their occupied land as collateral in case they want to borrow money for long term investment from financial institutions.

2.16.9 Information asymmetry

A network of linkages and social relations within local regional or national communities enables local people or entrepreneurs to be better positioned to identify new opportunities, to access market information and to assemble the necessary resources that will enable them to grasp those opportunities that are available at generating employment, income and thus accumulate assets (Ozgen and Minsky, 2007). Poorly developed information networks in rural areas pose a great threat to entrepreneurial growth.

Although most rural farmers can afford purchasing simple cellphone gadgets, access to internet remains a major challenge with the few internet cafés in rural townships charging exorbitant prices for such services. In this modern day where the internet has become a major source of all sorts of information, agriculture included, failure to access it can certainly result in marginalization of rural communities. A low literacy level among smallholder farmers also affects their access to important market information and business opportunities. As noted by Haftendorn and Salzano (2003), lack of market information (on commodity prices, suppliers) often leads to loss of income and exploitation of rural entrepreneurs by middlemen.

2.17 Conceptual framework

Entrepreneurial behaviour is a function of various interlinked factors acting as stimulus or barrier in developing the entrepreneurial spirit in individuals. In line with the objectives of this study a conceptual framework was designed to provide a connexion between the determinants and indicators of entrepreneurship. Focus is also given on the entrepreneurial environment and the entrepreneur's resourcefulness since they have a contributory effect on the farmers' entrepreneurial orientation. As illustrated in figure 2.4. The conceptual framework treats entrepreneurial behaviour as an outcome variable of various determinants thus

acknowledging that there could be a significant variation in the behaviour of entrepreneurs.

2.17.1 Determinants of entrepreneurship

Entrepreneurship behaviour is considered as a result of a complex decisional making process through which the individual chooses his professional future between the alternatives of starting his own business or work for others (Baumol, 1990; Campbell, 1992; Douglas and Shepherd, 2000). A review of literature shows demographic characteristics such as age, race and gender are common factors in the field of entrepreneurship studies, though a great deal of variations exist on the authors' conclusions on how these demographic factors affect entrepreneurship. In previous literature, being female yielded a negative effect on success; therefore, we would expect this variable to negatively affect start-up.

On age, literature shows that individuals above the age of 45 have a low entrepreneurship level when compared to those below this age (Peake and Marshall, 2006). Carter (2003) also echoed the similar sentiments indicating that younger and better trained farmers are more likely to have a positive attitude towards new market opportunities and are more willing to engage in new ventures.

According to South Africa's Global Entrepreneurial Monitoring report compiled by (Orford, *et al.*, 2004), men and people between the ages of 25 and 44 are more likely to be entrepreneurs than women and people younger than 25 and older than 44. Thus this study tried to establish whether these demographic factors can also affect entrepreneurship among smallholder irrigation farmers.

The human capital variables selected for the analysis were education, farming experience and agricultural training. Education has been used as a proxy for general human capital throughout the entrepreneurship literature (Reynolds, 1997; McElwee and Bosworth 2010).

The GEM, report by (Orford *et al.*, 2004) associates the better entrepreneurial level demonstrated by whites when compared to fellow black South Africans to be a result of educational discrepancies between the two races. In contrary other GEM reports cite the traditional education system inherited from the apartheid era as being

responsible for the low entrepreneurial spirit among all South Africans, see reports by (Maas and Herrington 2006; and Kelly *et al.*, 2012). Ronstadt (1989) also claims that traditional education often leads to conformity and decreases tolerance for ambiguity. The results for education are somewhat mixed, and to this regard the model seeks to establish the nexus between the farmers' level of education and their displayed entrepreneurial behaviour. The question is; how does formal education affect entrepreneurship?

2.17.2 Entrepreneurial resourcefulness

Misra and Kumar (2000) define entrepreneurial resourcefulness as the ability to identify opportunities in the environment and regulate and direct behaviour to successfully cope with the task of creating and managing an organisation to pursue the opportunity. Components studied include innovativeness and networking. Innovativeness was measured by assessing the respondents' level of creativity on their farm enterprises. Social networks, often understood as the webs of interpersonal relation in which most actions of people or entities are embedded (Granovetter, 1985), can be especially useful for agricultural entrepreneurs as they can help supplant weak institutions and attain the collective efficiency necessary to overcome infrastructure constraints in order to speed up market entries (Mesquita & Lazzarini, 2008). The expected outcome on the networking aspect was that farmers with a participation in farmer groups and other social networks also demonstrate high entrepreneurial level.

2.17.3 The entrepreneurial environment

An entrepreneurial environment refers to the combination of external factors that influence entrepreneurial behaviour. It subsumes a scope of overall cultural, economic, political and social factors that enhance or under-mine an individual's propensity to undertake entrepreneurial activities and also the training, assistance and non-financial support available to entrepreneurs.

Components forming the entrepreneurial environment include among others; financial and non-financial support, media and social networks, government policy and culture.

2.17.4 Indicators of entrepreneurship

Given the complex and broad nature of entrepreneurship as a subject for research, the need to focus on common indicators of entrepreneurial behaviour was considered. As indicated in figure 2.2, eight aspects were measured to determine the entrepreneurial behaviour of respondent farmers.

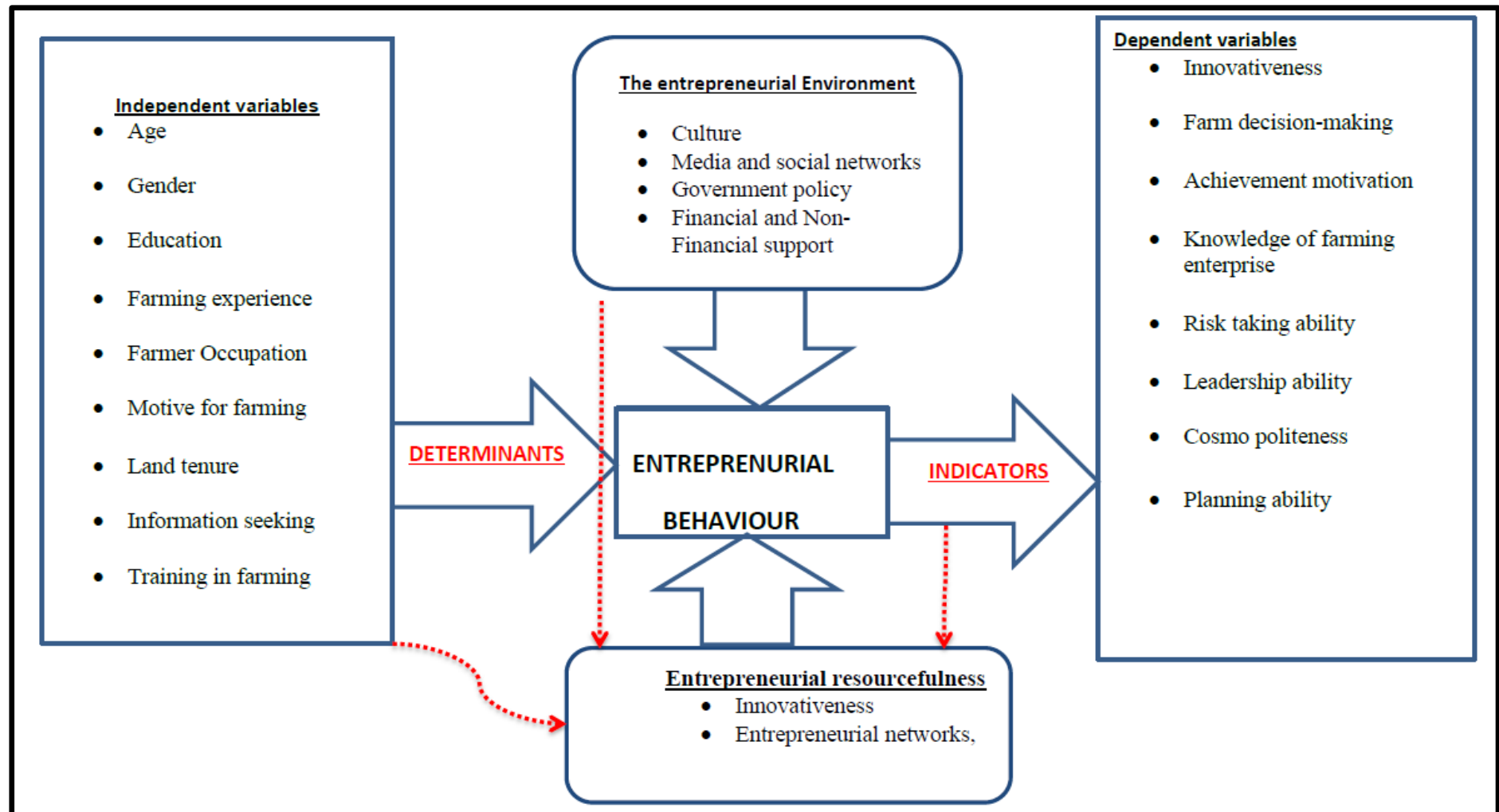


Figure 2: 5 Conceptual model of entrepreneurial behaviour of smallholder irrigation farmers

2.18 Chapter Summary

Entrepreneurship is mostly about risks, innovation, creative thinking and an entrepreneur is the one who creates and innovates something recognized around perceived opportunities by accepting risks and failures. From the various schools of thought on entrepreneurship discussed in this chapter it can be concluded that entrepreneurship is a broad concept which can assume various definitions depending on the context in which it is being used. Literature provided in this also indicates the existence of various determinant factors shaping the farmer's entrepreneurial behaviour with culture being one of the key determinants.

The chapter discussed the various demonstrable characteristics which can be used to identify successful entrepreneurs. On South Africa's entrepreneurial performance the literature review has provided survey evidence which portrays the country as having a low total early entrepreneurial activity when compared to other countries in sub Saharan Africa.

An overview of the South African agriculture sector clearly indicates how agriculture continues to play an important role as a contributor to the gross domestic product and a potential source of employment to the rural poor. As highlighted in subsection 2.14 smallholder farmers in South Africa continue to make a less significant contribution to the national agricultural sector amid getting a substantial amount of support from the state thus calling for the need to explore the level of entrepreneurship demonstrated by this sector. Information discussed in subsections 2.15 and 2.16 highlighted the possible constraints that have led to the observed entrepreneurial discrepancy between smallholder farmers and commercial farmers.

As evidenced in the literature the current entrepreneurial monitoring approach (GEM model) used in South Africa was mainly focused on assessing entrepreneurship in the commercial and small medium enterprises whilst isolating the smallholder farmers. Despite the smallholder farmers being at the centre of many agrarian debates there seems to be limited available information on their entrepreneurial propensity.

This research therefore seeks to address this gap by investigating and documenting the entrepreneurship level of smallholder irrigation farmers.

In the following chapter a detailed description or profile of the study area; Intsika Yethu Municipality where Qamata irrigation scheme is located

CHAPTER 3

SOCIO-ECONOMIC PROFILE AND PHYSICAL BACK GROUND OF THE STUDY AREA.

3.1. Introduction

The research study on entrepreneurial behaviour of smallholder irrigation farmers was conducted during the year 2013 at Qamata irrigation scheme located in Intsika Yethu municipality. This chapter provides a broad profile of Intsika Yethu municipality focusing on the demographics and socio economic dynamics characterising the rural municipality. Succeeding subsections provide a physical background of Qamata area from which the respondents were drawn.

3.1.1. Location and demographics

The Eastern Cape is home to about 7 million individuals (Statistics South Africa, 2007a). Intsika Yethu Municipality is one of the eight local municipalities that form the Chris Hani District Municipality. The municipality (Intsika Yethu) is mainly rural with 95% of its population living in the rural areas. Recent statistics indicate the municipality has 23 wards with a population of 194 246 people and 44 768 households (Intsika Yethu Municipality LED strategy and Implementation plan, 2007). The physical area of the municipality is 3,026.51m², but because of its rugged terrain, only 17% of total land area is suitable for crop farming, yet 71% of the population relies mainly on subsistence farming.

3.1.2. Age and Gender Distribution

Global Insight 2008 statistics indicates that 53% of the municipality's population is female, whilst 47% are males. The disparity is more than that of the national average of 49% male and 51% female. About 60% is children in the school going age group (0 – 19 years). About 7% falls within the pension age group. Only 33% are in the working age group (20 – 64 years). This means that there is high dependency ratio as the 67% of the population depend on the 33% constituting the potential workforce in the area.

3.1.3. Level of education

Results from the 2011 census survey revealed that low education levels, high levels of functional illiteracy and skewed skills base characterize Intsika Yethu. This challenge is seen by Intsika Yethu officials as one of the major contributors to systemic poverty and unemployment that the municipality experiences. With only 5% of the population having a tertiary / post matric qualification and 15% with no schooling at all there is a need to energize efforts to improve education and skills development. The Socio Economic Profile notes that of all the people formally employed the majority (more that 60%) are in occupational categories that do not respond to the economic development challenges Intsika Yethu faces. The municipality has limited skills bases in appropriate technologies, agricultural scientists, basic plumbing, foresters, artisans, management and entrepreneurship.

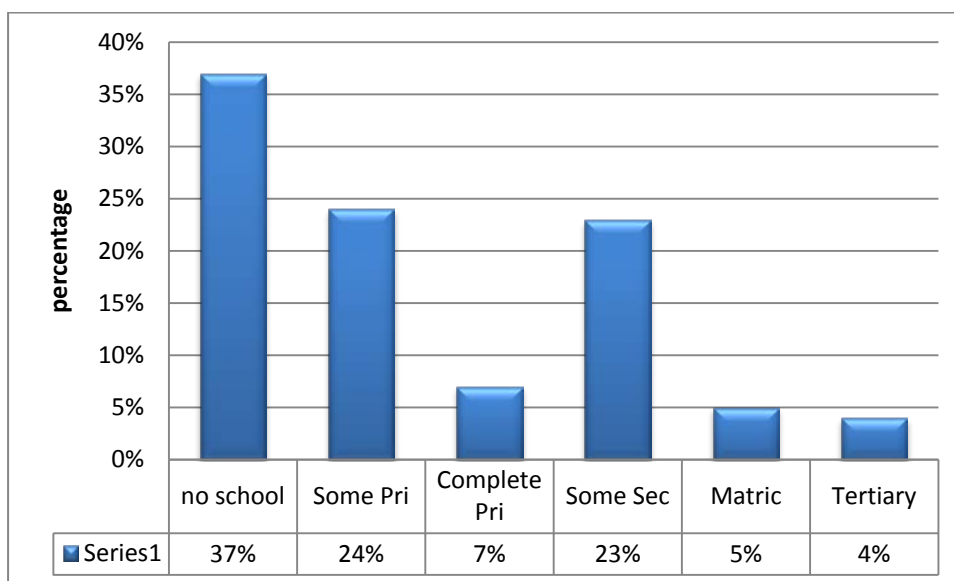


Figure3: 1 Levels of educational attainment by adult population (≥20yrs)

Source: Intsika Yethu Integrated Development Plan (2010/2011)

3.1.4. Access to Basic Infrastructure

The municipality has experienced improvements in access to basic services. People with access to piped water has improved from 18.5% to 35.5% between 1996 and 2001; access to electricity increased from 4.9% to 30.7; and access to electricity improved from 11.9% to 70.9% over the same period. There have also been huge

strides made in ensuring that communities have access to education, health and sanitation. The improvement in access to infrastructure has positive implications for economic development. Access to electricity for example could be used as a catalyst to create rural based value adding business opportunities and access to technology (computers and internet) in the rural areas. Increased access to telephones also makes it possible for communities to be accessible and engage in various business activities that the municipality can facilitate.

3.1.5. Unemployment

Even though the economy of Intsika Yethu has shown positive growth of up to 50% over the last 10 years, due to thinness of the size of the overall economy very little improvement has occurred in the fight against unemployment. Worsening the unemployment situation is the inability of the local economy to absorb new job entrants thus further complicating the unemployment situation. The high dependence on community services, limited skills base, lack of entrepreneurship and lack of private sector investments are some of the contributing factors to the structural unemployment challenge.

Recent survey by Statistics South Africa (2007) estimated unemployment rate of Intsika Yethu to be as high as 87.1%. When compared to the district as whole, our municipality remains the worst affected. Figure 3.2 provides the graphical representation on the state of unemployment in Chris Hani district.

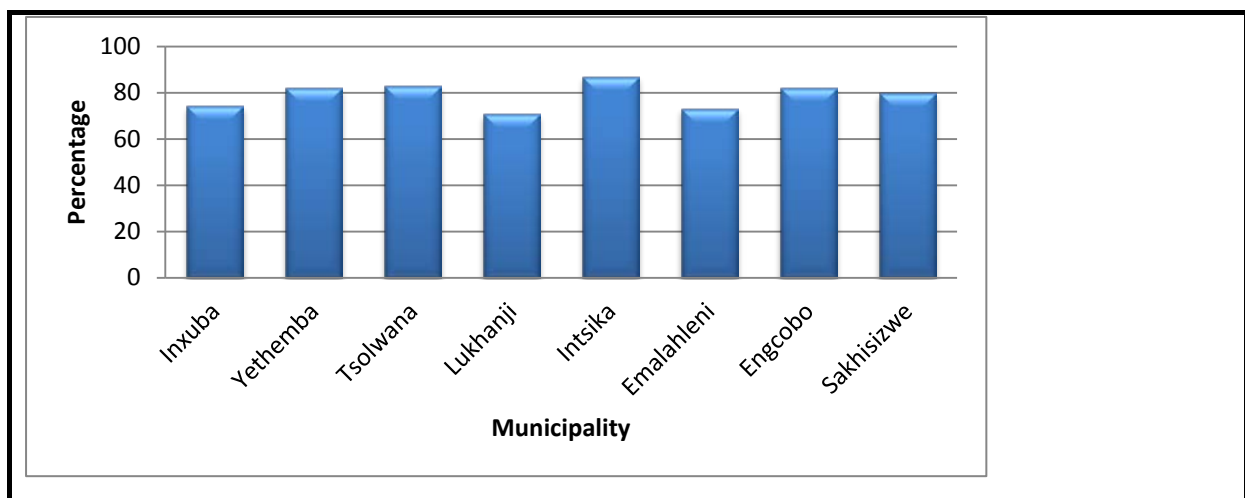


Figure3: 2 Rate of unemployment distribution in Chris Hani District

Source: Intsika Yethu Integrated Development Plan (2010/2011)

As indicated in Figure 3.3, unemployment remains a major challenge to all the municipalities in the district; and to curb this situation there is need to invest in projects aimed at sustainable economic growth and poverty alleviation.

3.1.6. Household Income Distribution

Household income is a useful proxy for understanding levels of poverty. The analysis (RSS 2006) of monthly household income distribution within the Intsika Yethu municipality shows that an estimated 76% of households can be regarded as poor with gross monthly incomes of less than R1500. Figure 3.3 presents information on the proportion of poor households across the eight municipalities located in Chris Hani District.

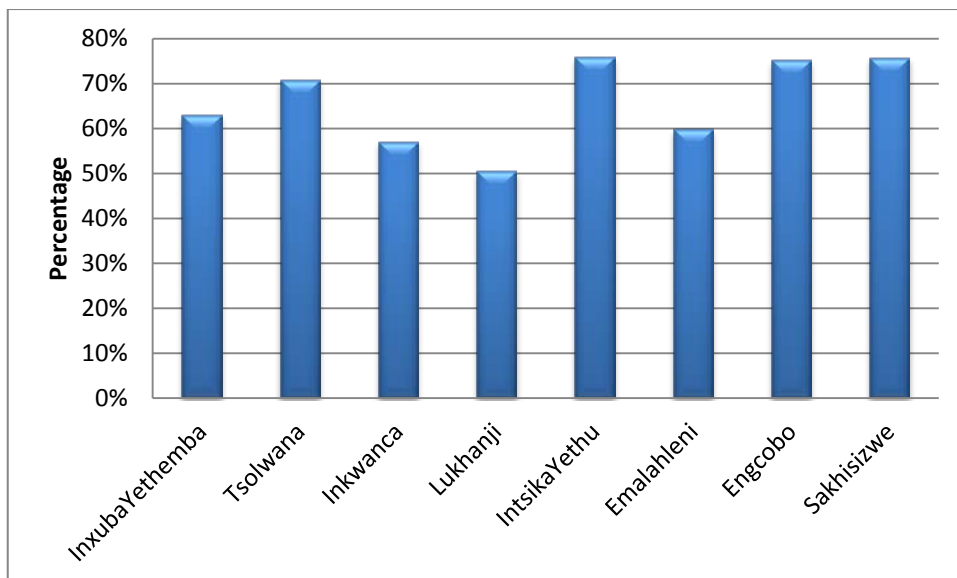


Figure3: 3 Percentage of Households receiving less than R1500/month across the 8 municipalities under CHDM.

Source Intsika Yethu draft Integrated Development Plan 2011/12

With more than 76% of its inhabitants earning less than R1500 per month the Intsika Yethu can be classified as one of the poorest and underdeveloped municipalities in the country. The Human Development Index for Intsika Yethu is 0.46 compared to the national HDI of 0.59.

3.2. The Agricultural economy of Intsika Yethu

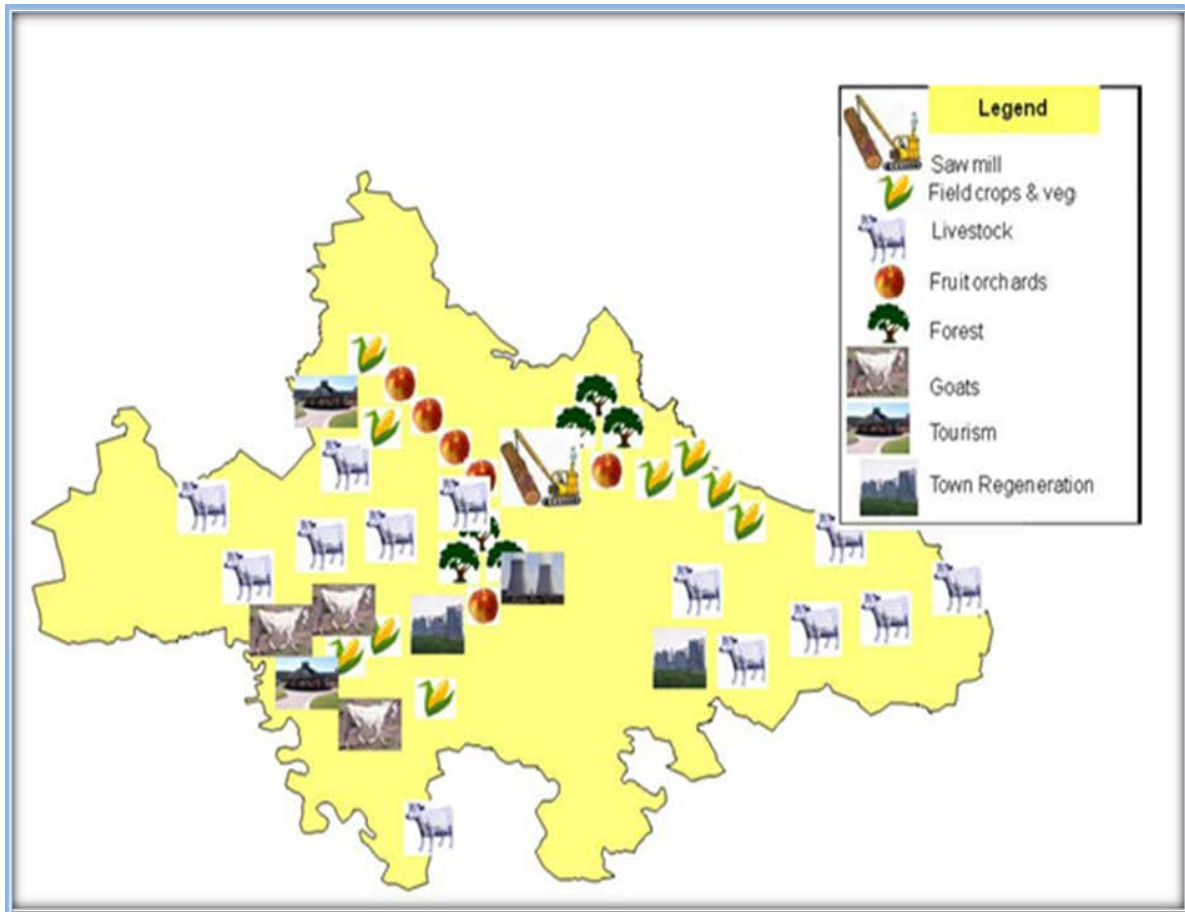
Agriculture plays a significant role to the municipal local economy. The sector contributes 14, 6% the municipality's GDP making it the third most important sector

after services and trade sectors. Cattle, sheep and goats are the common livestock in this area with sheep dominating (Obi, 2011). These may be for sale or slaughter for home consumption and ceremonial purposes. Horses are meant for riding (form of transport) and sometimes hired for drought power. Donkeys are found in very small numbers. Crop and vegetable production activities are also common in areas like Qamata in Cofimvaba and Ncora in Tsomo

Existing irrigation infrastructure at Ncora, Bilatye and Qamata make Intsika Yethu one of the few municipalities in the Eastern Cape with a total land area estimated over 8 500 ha with irrigation infrastructure. The challenge for the municipality is turn around these schemes and ensure they produce quality produce and volumes that can supply the province.

3.3. Rural entrepreneurship in Intsika Yethu.

Economic activity is largely concentrated in Cofimvaba town where retail shops, mainly dominated by foreign nationals and non-black South Africans characterise the town. The level of entrepreneurship among the locals is generally low and those who attempt to run enterprises tend to be less competitive. The municipality has been making initiatives to promote entrepreneurship through funding of farmer cooperatives and offering financial institutional support to livestock producers, but the scale of support remains marginal.



Map 3.1.: Intsika Yethu Resource Map

Source: Intsika Yethu Municipality

3.4. Physical background of Qamata.

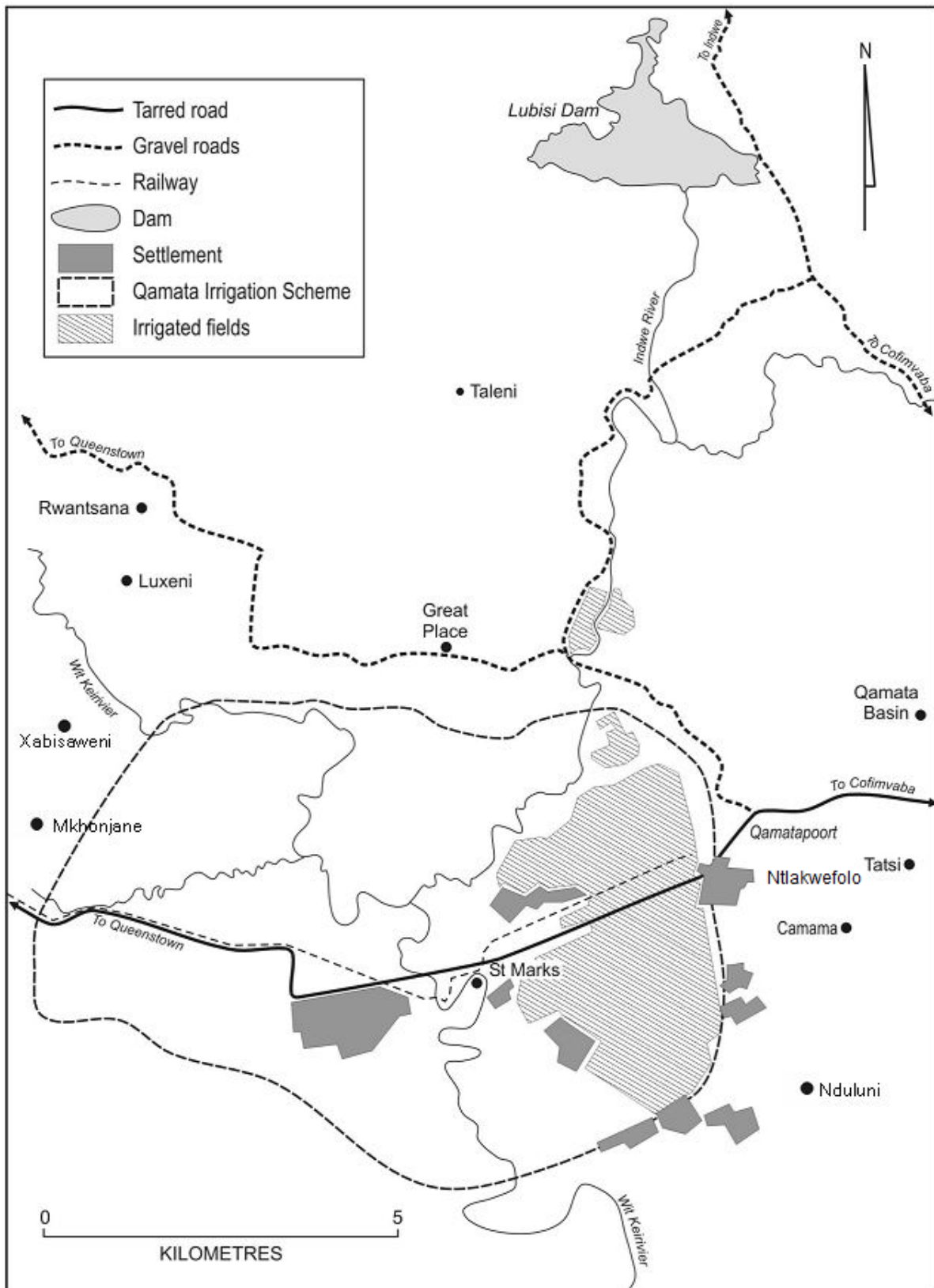
The Qamata Irrigation Scheme (QIS) is located in the Qamata Basin on the banks of the Indwe River near its confluence with the Great White Kei River. The scheme is positioned approximately 20 Km from the local municipal town of Cofimvaba along the R63 Mthatha-Queenstown route. The scheme was established in 1968 under the funding of South African government through the Department of Bantu Development. The total cost of the project including the dam, irrigation scheme and farmland was R175 million (Loxton, Venn and Associates, 1998:1). The entire scheme covers a total surface area of about 2 601 ha (ARDRI, 1996) with 1959 hectares under irrigation.

3.4.1. Climate

The climate in Qamata varies from mild to warm and humid, with most of the rainfall being experienced in summer. The rainfall is relatively high from November to April (401-500 mm) and low from May to October (151-200 mm). Average temperatures vary; the highest being in January (20-22°C) and the lowest in July (8-10°C). The area is dry with frosty winters which normally experience light drizzles followed by hot summer months. The extremely high temperatures experienced during summer cause excessive evaporation thus exposing the area to recurrent droughts especially the dryland farming communities.

3.4.2. Natural Vegetation

The veld is generally of the sour type which dries up in winter and in periods of less or no rain. In recent years an invasive thorn bush has invaded areas surrounding Qamata making the vegetation to appear like a bush veld. Annual grasses and weeds dominate the landscape, with isolated patches of trees occurring along stream banks. Exotic pine trees planted to act as wind breaks also dominate areas surrounding the farm lands.



Map 3.2; Map of Qamata irrigation scheme

3.4.3. Relief and drainage

Relief of an area determines the nature and expanse of land available for cultivation and development and environmental policies such as soil conservation; and the drainage influences the amount of water available for irrigation. The topography of the Qamata area is made up of a gently undulating basin, flanked by retreating mountains. The fairly level gradient of the site of the scheme permits the use of agricultural machinery. However, the highly erodible nature of the soil on the slopes of the surrounding mountains poses a serious threat to the irrigated land. Rainfall runoff combined with high grazing pressure exerted on the land also exposes the land to degradation. The most important river draining the area is the Indwe River, dammed at Lubisi to provide water for the Qamata Irrigation Scheme.

3.5. Chapter summary

The chapter intended to give a comprehensive description of the study area; it can be concluded that Intsika municipality is characterised by pervasive poverty and the majority of its inhabitants depend on social grants and informal employment for survival. The municipality has not done much to rural entrepreneurship in the area thus leading to a high rate of outmigration by the youth. Despite receiving good summer rainfalls the extremely high temperatures reduces the potential for rain fed agriculture in the area. In the succeeding chapter the research methods used in the survey are presented.

CHAPTER 4

RESEARCH METHODOLOGY

4.1. Research Design

This chapter describes the materials and methods used in conducting the present investigation. It highlights the sampling procedures, data collection tools and operational approaches applied in measuring the respondents' entrepreneurial behaviour. Furthermore the analytical methods used are presented and this will be followed by the ethical considerations taken during field work and finally a summary of the chapter.

4.1.1. Sampling Procedures

As already alluded in preceding chapters the main objective of the study was to establish the level of entrepreneurship among smallholder irrigation farmers at Qamata irrigation scheme located in Intsika Yethu municipality in the former Transkei. Approximately 1000 households are known to be involved in some form of irrigation farming at QIS, however, due to limitation of funds and time, a representative sample of 110 respondents was selected. The use of a sample instead of the whole population has also been supported by Curwin and Slater (1996:45-51) who expressed that a well extracted population sample will permit a higher overall level of accuracy than a total enumeration because focusing on a few cases will allow for an in-depth survey and detailed analysis.

Table 4: 1 Distribution of respondent farmers

Sample size	Plot holders	Non plot holders
110	68	42

As indicated in Table 4.1 plot holders constituted a larger proportion of the sample and this was because the majority of the households surrounding Qamata irrigation scheme had been allocated plots at the inception of the scheme.

4.1.2. Sampling method

Sampling involves selecting a subset of elements from a population; a perfect representative sample should therefore be a “*mirror image*” of the population from which it was selected. Sampling methods used have an effect on the reliability of the data collected and thus it is crucial that the sampling methodology avoids statistical bias (Tatter and Keuter, 2008)

For this survey the respondents were picked through the use simple random sampling technique. The advantage of this method is that each individual in the population has the same probability of being selected as part of the sample as any other individual. This eliminates the bias inherent in non-probability sampling procedures because the probability sampling process is random; every farmer had an equal opportunity of selection in the population. However, the challenge with this technique is that, since every person or item in a population has to be listed before the corresponding random numbers can be read, this method is very cumbersome to use for large populations (ABS, 2006). Due to non-availability of some of the intended respondents and also owing to the time factor convenience sampling was also used to interview 20 of the 110 farmers.

4.1.3. Data collection tools

The data collection tool was a pre-tested questionnaire designed to obtain both qualitative and quantitative data required to address the research objectives. Printed questionnaires were administered to gather the required data from primary sources and this was achieved by conducting direct interviews with the respondent farmers. The use of questionnaires as a method of data collection in research is well established and in most cases the standard approach has been through the use of paper questionnaires, which are then delivered to the target population. The use of a printed questionnaire has an advantage of being inexpensive, and makes it possible to survey a large population size within a short space of time (Bryman, 2012). Since mailed questionnaires have a disadvantage of low response rate which can be as low as thirteen percent (Malhotra, 1999 the administration of questionnaires was done through a direct field survey conducted over a period of two months (August to September).

4.1.4. Questionnaire design

The questionnaire had 7 sections (A-G) as shown in Appendix 1. Section A was designed to explore the participant's demographic data including such issues as marital status, gender, education level etc. Section B of the questionnaire elicited household characteristics such as household size and sources of income.

The third section focused on issues regarding land use and preparation and this was followed by section D which was aimed at gathering data on irrigation participation and water use among farmers. Some of the key data collected in this section included the number of years farmers had been farming on the scheme, cropping frequency and reliability of irrigation water supply.

The fifth section was meant to gather crop production data for the 2012-2013 production season on several key crops that had been identified at Qamata irrigation scheme. To address main objective of the study, a whole section (section F) asked a wide range questions seeking to gather data on the various components constituting the farmer's entrepreneurial behaviour. This section had ten subsections aimed at soliciting data regarding the various key components of entrepreneurship. The last section gathered some general information regarded as pertinent in this survey.

4.1.5. The household as the basic unit for data collection

FAO (1996) recommends the use of the household, rather than the individual as the basic unit of analysis when considering the economic situation of society (though data for individuals may be collected separately). The term 'household' or 'farm household' can be assigned a variety of meanings depending on the nature of the survey in which it is being used. This study adopted the definition provided by Eurostat (1996) and Canberra Group (2001) in describing a household. Contextually a household was thus defined as ; *“one person living alone or a small group of persons who share the same living accommodation, who pool some, or all, of their income and wealth and who consume certain types of goods and services collectively, mainly housing and food”*. As a result each respondent in this survey represented a separate household unit.

4.2. Methods used for measurement of entrepreneurial behaviour (dependent variable).

Entrepreneurial behaviour was taken as a function of eight components namely ,innovativeness, farm decision making, achievement motivation, knowledge of farming enterprise, risk taking ability, Planning ability, leadership ability and Cosmopolitaness. The summations of scores of all these ten components constitute the entrepreneurial behaviour score of the respondents. The criterion used to measure each of these components in an objective way is given below.

- **Innovation**

Entrepreneurs' innovativeness and personality are a basis for the adoption of innovations in Small- and Medium-sized Enterprises (SMEs) (Markati, et.al 2008).Innovation is measured by the degree to which an individual adopts new ideas relatively earlier than others in his social system (Rogers and Svenning, 1969). For this research innovation was operationally defined as a personal trait of creativeness displayed by the farmer through trying of new farming technologies, adopting them and making changes or improvements to existing farming methods. Six questions seeking to establish the smallholder irrigation farmer's innovativeness were asked .For each question a ranking system was used ranging from a score of zero for the least innovativeness and two being the highest level. Thus the total score measuring each smallholder irrigation farmer degree of innovation would range from zero to twelve

- **Decision Making Ability**

It is operationally defined as the ability of farmers to independently select the most efficient means from among the available alternatives on the basis of scientific criteria for achieving maximum economic profit. The component of decision making had four questions from which weightages ranging from a low of 1, 2 and 3, were assigned, with 1 and 3 representing the minimum and maximum expected scores respectively. After a computation of all the scores from the four questions the possible score for each respondent on his decision-making ability was between 4 and 12.

- **Achievement motivation**

It is assumed that achievement motivation forces the individual towards reaching some goals, which he/she has set for him/herself. McClelland (1961) defined achievement motivation as a social value that emphasizes a desire for the excellence in order for an individual to attain a sense of personal accomplishment. It was operationally defined as the farmer's demonstrated values or attitudes which attach greater importance on the need for operating the farming enterprise as a successfully business entity. The instrument consisted of three statements. The responses for each of the statement were rated on a three point continuum sated as: "agree", "undecided" and "disagree". Statements 1 and 3 were positive and three weights 0,1and 2 were assigned to the responses from the lowest up to the highest respectively and for the negative statement number 2 the scores were inversely assigned. Thus, the total score for each respondent farmer on his achievement motivation would range from zero to six.

- **Knowledge of farming enterprise**

Implementation of new agricultural innovations requires farmers to have a fair knowledge on the modern technology .Knowledge can be described as the level at which the farmer has mastered the necessary information required for the profitable operation of the farming enterprise. The Four questions were asked under this component with the main intention being to explore the respondent farmers' knowledge on basic crop management practices. The responses for each of the statement were rated on a three point scale presented as "low", "intermediate" and "high" .Scores of 0, 1 and 2 were assigned to the three responses respectively. The total score range on each respondent level of knowledge was zero to eight.

- **Risk Taking Ability**

The ability to take risk is one of the key qualities characterising a farmer entrepreneur. Risk taking ability was operationalized as the degree to which the farmer is oriented towards risk and uncertainty and the courage demonstrated towards facing various problems in farming. Five statements with two alternative

responses Yes (1) and No (0) were used to infer on the farmers' risk taking orientation. The aggregate of weights of the five statements was the total score of a respondent on this variable. Thus the possible score range was from 0 to 5.

- **Planning ability,**

Farm Planning is regarded as one of the core managerial principles that must be followed to guarantee success. To evaluate the farmers' planning ability, five statements which tested the degree at which the farmer followed perceived farm planning practices were asked. Each statement was measured on a three point continuum as "No", "Sometimes" and "Always" by assigning the scores 0, 1 and 2 respectively. The overall score range expected from each respondent was from 0 to 10.

- **Leadership ability**

Leadership ability was operationalized as the degree to which an individual initiates or motivates the action of others. In the present study, leadership ability was measured along a three point rating scale "Always", "Some times" and "no" with decreasing scores of 2, 1 and 0 assigned respectively. The total score was computed for each respondent by summing up the scores recorded. Thus the expected score aggregate for each respondent on the leadership component ranged from 0 to 6.

- **Cosmo- politeness**

It was operationalized as the degree to which a farmer is oriented outside his community or village that might make him more accessible with innovations. The instrument consisted of four statements and responses were obtained on two point continuum namely, 'Yes' and 'No' with a weightage of 1 and 0, being assigned respectively. The total score was computed by summing up all the scores recorded allowing a score range of 0 to 4 for each respondent.

4.3. Statistical tools used in the study

The gathered data were then analysed using the Statistical Package for Social Sciences (SPSS) and the Microsoft Excel (MS Excel) computer packages whereby descriptive statistics and logistic regression were used.

4.3.1. Econometric Model

The Binary Logistic regression analysis was applied to test the extent to which social-demographic and economic factors such as age, gender, marital status, household size, level of education, farming experience, land tenure, information seeking, motive of farming and farm income influences the farmers' entrepreneurial behaviour. Respondents' entrepreneurial behaviour was the binary dependent variable (measured as 1 = High if the farmer had high scores on the attribute; or 0 = Low if the farmer had low scores on the attribute). More information on the variables has been fully defined in Tables 4.2.

4.3.2. Model summary

The binary logistic regression was preferred in analyzing data because the dependent variable was dichotomous, that is, high or low entrepreneurial tendencies based on its merits compared to others. Logistic regression is regularly used rather than discriminant analysis when there are only two categories of the dependent variable. Logistic regression is also easier to use with SPSS than discriminant analysis when there is a mixture of numerical and categorical independent variable, because it includes procedures for generating the necessary dummy variables automatically, requires fewer assumptions, and is more statistically robust (O'Connell, 2005). The following model was used:

$$\text{Logit} [p(x)] = \log\left[\frac{p(x)}{1-p(x)}\right] = \alpha + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \dots + \epsilon \dots \dots \dots 1$$

Logistic regression involves fitting an equation of the following form to the data:

$$\text{Logit}(p_i) = \alpha + \beta_1 x_{1,i} + \beta_2 x_{2,i} + \beta_3 x_{3,i} + \dots + \beta_p x_{p,i} + \dots + \epsilon \dots \dots \dots 2$$

Where $\text{Logit } p_i$; is binary and represents the probability of having high or low entrepreneurial behaviour coded as 1 or 0 respectively.

$\beta_1 \dots \beta_p$ = Regression coefficients

α = Intercept

$x_{1,i} \dots x_{p,i}$ = Independent variables or predictor variables

ϵ_i = Error term

Table 4: 2 Model variables applied in the analysis.

INDEPENDENT/ PREDICTOR VARIABLES	Unit	Type of Variable	Expected sign In relationship Entrepreneurship <u>+/-</u>
Gender	Male or Female	Categorical	+/-
Age of head	Actual in years	Continuous	+/-
Marital status	Status of marriage	Categorical	+/-
Education level	Highest level of education attained	Continuous	+/-
Land tenure	Form of land tenure	Categorical	+
Motive for farming	Whether profit making or not for profit	Categorical	+
Total farm Income	Attended or did not attend	Categorical	+
Training in farm management	Had or did not have	Categorical	+/-
Information seeking tendency	Whether high or low	Categorical	+/-
Farming experience	Actual years in farming	Continuous	+

4.3.3. Model variables

Previous research work describes the variation in the level of entrepreneurship among individuals to be a subject of various determinant factors. The independent variables presumed to have an effect on entrepreneurial performance are presented in Table 4.2 and explained in preceding subsections.

(i) Gender

Gender relates to socially assigned roles and behaviours attributable to men and women; it refers to the social meaning of biological sex differences. Gender roles are roles that are played by both women and men and which are not determined by biological factors but by the socioeconomic and cultural environment or situation (Mollel and Mtenga, 2000). Gender affects the distribution of resources, wealth, work, decision-making, political power as well as the enjoyment of rights and entitlements within the family and in public life (Welch *et al.*, 2000). The household head's gender can therefore be of significance to the farmer's access of resources and success in farming and is hypothesized to be positively or negatively correlated with entrepreneurship. .

(ii) Age

This variable is expressed as the actual age of the household head in years. Previous studies, including Bembridge (1984), have established that this variable is a key determinant of behavioural patterns of household and community members. Younger farmers are expected to be more technically constrained than older farmers who are perceived to have acquired experience of farming and resources. In contrary literature evidence from the works of Peake and Marshall (2006) shows that individuals below the age of 45 to possess higher entrepreneurial intentions when compared to those above that age. In this view increase in age can be hypothesized as having either a positive or negative effect on entrepreneurship.

(iii) Education level

Studies conducted in several developing countries have confirmed the importance of education in the decision-making process with implications for the socio-economic development and human capital production (Schultz, 1964; Bembridge, 1984; Mushunje, 2005). There had been significant amount of research regarding the impact of education on entrepreneurial behaviour. While some researchers claim that education lessens the entrepreneurial desire/skills of the individual there are others who say that people's entrepreneurial success actually increases with education (Ertuna and Gurel,2008).For the agricultural sector, earlier studies equally

established that low literacy levels among farmers were among the key hindrances to adoption of new technologies by the smallholder farming sector. (Bembridge, 1984; Agyekum 2009). Level of education is therefore expected to have a converse or positive influence on entrepreneurial development processes. In the light of that, it can be hypothesized that there is a positive correlation between education and market access.

(iv) Marital status

With growing commercialization, married women work more hours than unmarried ones, working not only on non-cash food crops but also on non-food cash crops (Kiriti and Tisdell, 2003). Married women seem to lose their decision-making ability with growth of agricultural commercialization, as husbands make most decisions to do with cash crops. Married women in some societies also have little or no power to change the way land is allocated between food and non-food cash crops. Married women have also been found to have less control over their wealth or benefits of their work efforts (Kiriti and Tisdell, 2003; Joseph, 2012). In this the assumption was that marital status can have an inverse or converse relationship with entrepreneurship depending on the household head's gender and degree of influence within the family.

(v) Land tenure

Land tenure and property rights affect the application of technologies for agricultural and natural resource management. Secured property rights give sufficient incentives to the farmers to increase their efficiencies in terms of productivity and ensure environmental sustainability. It is natural that without secured property rights farmers do not feel emotional attachment to the land they cultivate, do not invest in land development and will not use inputs efficiently (Tenaw *et al.*, 2009). Secure and well-defined land rights have also been observed to be key for household asset ownership, productive development, and factor market functioning (Deininger, 2003). In this model thus land tenure is expected to have a positive or negative relationship with entrepreneurship.

(vi) Farming experience

This variable measures the number of years a farmer has been engaged in farming. It can be hypothesized that the lesser the number of years the farmer is involved in farming, the higher the probability of being technically constrained because certain farming techniques require that the farmer possesses some degree of experience. Thus, there is a positive correlation between entrepreneurship and farming experience.

(vii) Motive for farming

The farmer's motive farming is presented as a categorical variable indicating whether the farmers are driven by profit making or not. The presumptive hypothesis being that households that engage into farming for profit making are more likely to attain high entrepreneurial rankings than those engaging in farming for subsistence reasons or other purposes. The relationship between motive for farming and entrepreneurship is therefore a positive one.

(viii) Training

The role played by agricultural training on increased farm productivity is incontestable. In many developing countries farmer training programmes facilitated by international institutions such as the World Bank and the food agricultural organisation (FAO) have yielded tremendous results on smallholder farmer productivity (Anandajayasekeram *et al.*, 2007). Trained farmers are more likely to be more innovative and quick to adopt new technologies thus making them more productive than untrained farmers. In a recent survey conducted in East Africa (Davis *et al.*, 2010,) smallholder farmers who had received training were found to be more productive than their untrained counterparts. In this view, trained framers at Qamata irrigation scheme are expected to be more productive and entrepreneurial, thus it can be hypothesized that farmer training is positively related to entrepreneurship.

(ix) Information seeking

A study conducted by Jenssen and Koenig (2002) revealed that individuals with high access to information networks were had a great chance of accessing resources needed for business start-ups. On the effect of access to information on agricultural productivity Hunter (2007) noted an increase in productivity and profits among farmers who had more access to information. It is therefore presumed that farmers who regularly access information on farming methods and markets are more likely to be entrepreneurial than farmers experiencing the problem of information asymmetry.

(x) Total farm income

As farm income increases farmers are more likely to invest in their farming business and seek other methods to expand their enterprises. As noted by Kahan (2012) farmer entrepreneurs are more likely to engage in more productive farming activities that guarantee high returns. It can be assumed that there is a reciprocal correlation between total farm income and entrepreneurship

4.4. Chapter Summary

This chapter has given a background of the methodologies and approaches used to collect and analyse the data on the entrepreneurial behaviour of smallholder irrigation farmers at Qamata irrigation scheme. Having discussed these aspects, the following chapter will provide a present and discuss the research findings.

CHAPTER 5

RESULTS AND DISCUSSION

5.1 Introduction

This chapter will report on the findings of the study. It begins by providing a descriptive analysis on the demographics and socio economic physiognomies of the households included in the survey. It proceeds by presenting analytical results on the entrepreneurial behaviour of the respondents using both descriptive and inferential statistics in line with the research design. The chapter concludes by providing the synopsis of the research findings.

5.2 Demographics and socio economic characteristics of households.

In this section findings on the characteristics of the households in the study area are outlined. Household information is very important in research as the household is the basic social and economic unit of a society. A qualified discussion will be done on the demographic characteristics, human capital aspects income sources as well as other factors associated with livelihoods of households in the area.

5.2.1 Household size

There seems to be a consensus in the development economics and agricultural policy discourse on the role played by household members in providing farm labour in small scale farming enterprises. As noted by Mushunje (2005), small scale farming heavily depends on its family for labour as labour inputs largely replace capital inputs.

Despite impacting positively on farm labour, household size also affects the expenditure and consumption patterns. In this survey the household size was construed as a summation of all people living together under one roof including both family and non-family members. As indicated in table 5.1 the average household size of the farmers (N110) at Qamata irrigation scheme was 6.19. The largest household size had 10 members while the smallest household having 2 members. The figures almost correspond to those recorded in the same study area by Agyekum

(2009). The mean household size at Qamata irrigation scheme was significantly higher when compared to the 4 members per household recorded for Intsika Yethu municipality in 2011 household survey. As already stated, large household sizes for farming households can be a result of push factors such as the need for cheap family labour or in some extent the for social grants.

5.2.2 Age of respondents

Age is one of the most important factors pertaining to an individual's personality make-up, since one's needs, way of thinking and behaviour are all closely related to the number of years the farmer has lived (Bembridge, 1987). Bembridge (1987) also observed that although age may have an impairing effect on physical abilities, which are important on family holdings, several research studies have indicated little or no mental deterioration at least up to 60 years of age. As already alluded in chapter 2 previous research has also shown that some correlation between age and entrepreneurial behaviour, with Reynolds *et al* (2003) noting how individuals aged 25 to 34 were the candidates who were more likely to become entrepreneurs.

The average age of the household heads was 55.95 years. The ages of household heads ranged from 20 to 77. This result is in tandem with findings by Agyekum (2009) indicating a worrying where over 50% of the interviewed irrigation farmers were in the age groups ranging from 50 years upwards. Van Averbeké *et al* (1998) recorded the average age of household heads of irrigation farmers in the Eastern Cape to be 61 years. Most of the old aged farmers have been on the irrigation scheme since the homeland era.

Table 5: 1 Household characteristics

Variable	N	Mean	SD	Min	Max
House hold size	110	6.19	1.748	2	10
Age	110	55.95	12.263	20	77
Years in School	110	5.93	3.951	0	15
Farm experience (Yrs)	110	13.04	9.607	1	35
Family members working out of the district	110	1.16	0.991	0	4
Gender					
	Frequency	Percent	Valid %	Cumulative percentage	
Gender					
Female	69	62.7	62.7	62.7	
Male	41	37.3	37.3	100	
Total	110	100	100		
Marital status					
Single	20	18.2	18.2	18.2	
Married	41	37.3	37.3	55.5	
Divorced	8	7.3	7.3	62.8	
Widowed	22	20	20	82.8	
Co habiting	19	17.2	17.2	100	
Total	110	100	100		

Source: Survey results 2013

5.2.3 Gender of respondents

Gender of household head influences access to assets such as land and capital that have a direct bearing on agricultural productivity (Mainzen *et al* 2011). Gender was measured and presented binary that is either male or female. As indicated in table 5.1 findings concerning gender of heads of household indicate that 62.7% of the respondents were females as compared to 37.3% males. This trend may have resulted from outmigration by men shunning farm work and opting to work in urban areas and mines where they are guaranteed a stable remuneration. The findings on gender are

in contrary with those by Agyekum (2009) where males dominated both dry land and irrigation farming.

FAO (2011) stresses the need to consider the different forms of female-headed households stating that “When the husband has migrated for work the households are labelled *de facto* female-headed. On the other hand when the female-head of the household is divorced, separated or widowed the household is referred to as *de jure*.” Figure 5.1 indicates that 61 percent of the female headed households were *de facto* headed indicating that most of the women assume the household headship because their husbands are working or living far from home.

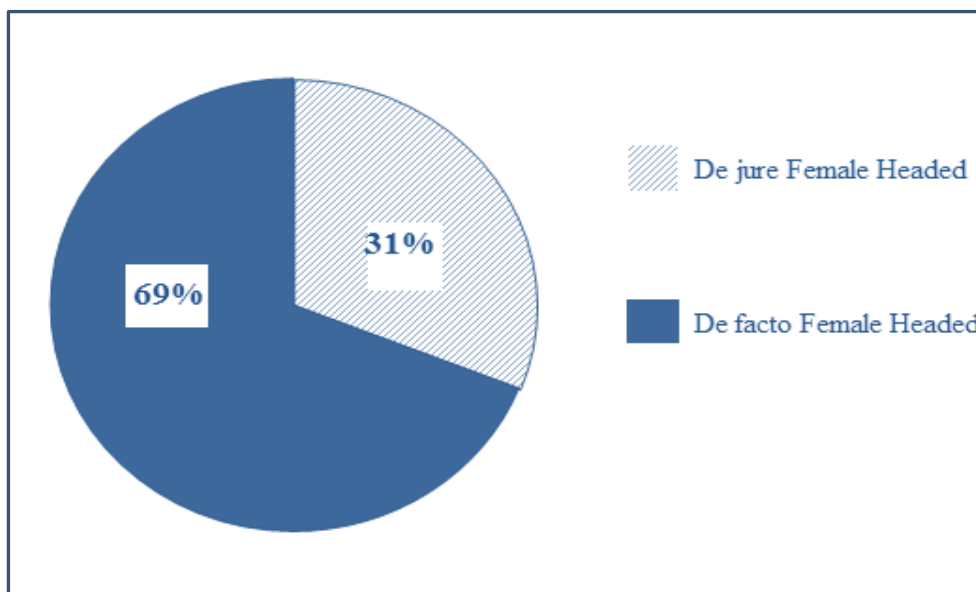


Figure 5: 1 Types of female headed households.

Source: Survey Results, 2013

When land was allocated at the inception of QIS the local chiefs adhered to the traditional African culture which denied women legal title to land (Greenberg, 2003a) as a result ninety percent of the land at the scheme was allocated to men. It's almost half a century since QIS was established and a number of reforms have taken place thus increasing the number of active female farmers at the scheme.

5.2.4 Marital Status of respondents

The marital status of the respondents has been presented in table 4.1. Despite the currently observed trend where few members of the Xhosa community are getting

into formal marriages, a larger proportion of the respondents 37.1 % were married indicating that marriage used to be a common and revered institution among the old generation.

The high proportion of unmarried and co-habiting individuals among the farmers does not augur well for agricultural and rural development because it limits farming efficiency as both labour and earning capacity of the affected farmers are reduced. The cross-tabulation of marital status and monthly income shows that 65 % of single farmers received farm incomes of less than R8000. The revelations of Table 5.2 correspond to findings of a social survey conducted by Grinstein-Weiss, Zhan and Sherraden (2004:2) which indicated a high prevalence of poverty among unmarried participants.

As indicated in table 5.2, widowed farmers' had higher income than divorced farmers giving an impression that the widowed might have inherited farming equipment and other assets which could impact positively on their farming operations.

Table 5: 2 Cross-tabulation: marital status and income structure of respondents

		Marital Status					Total
		Cohabiting	Married	Single	Divorced	Widowed	
INCOME GROUP	ZERO	2	8	3	2	1	16
	0-2000	1	9	5	1	0	16
	2001-4000	0	0	0	0	3	3
	4001-6000	4	6	3	0	2	15
	6001-8000	0	4	2	0	0	6
	8001+	13	14	7	5	15	54
Total		20	41	20	8	21	110

Source: Survey results.

5.2.5 Education of respondents

Bembridge (1987) noted that education has long been recognized as a central element in the socio-economic evolution of less developed countries.

As noted by Chitsa (2012), economic benefits of schooling include the potential to obtain paid employment or to generate income through self-employment using skills

learned in school. In agriculture, more years of formal schooling are expected to enhance efficiency. During the colonial era homeland authorities of the former Transkei placed tremendous emphasis on education in an attempt to develop the sub-region (Bembridge, 1984:132). The educational levels of the farmers at Qamata presented in figure 5.2 suggests that the farmers failed to utilise the opportunities offered by the authorities to acquire knowledge and skills to develop themselves. The trend on the level of education among the respondents in the study area corresponds to the figures recorded for Intsika Yethu municipal area in the Stats SA (2011) census survey where the majority of the adult population had very low levels of education with only 4% having post matric qualifications.

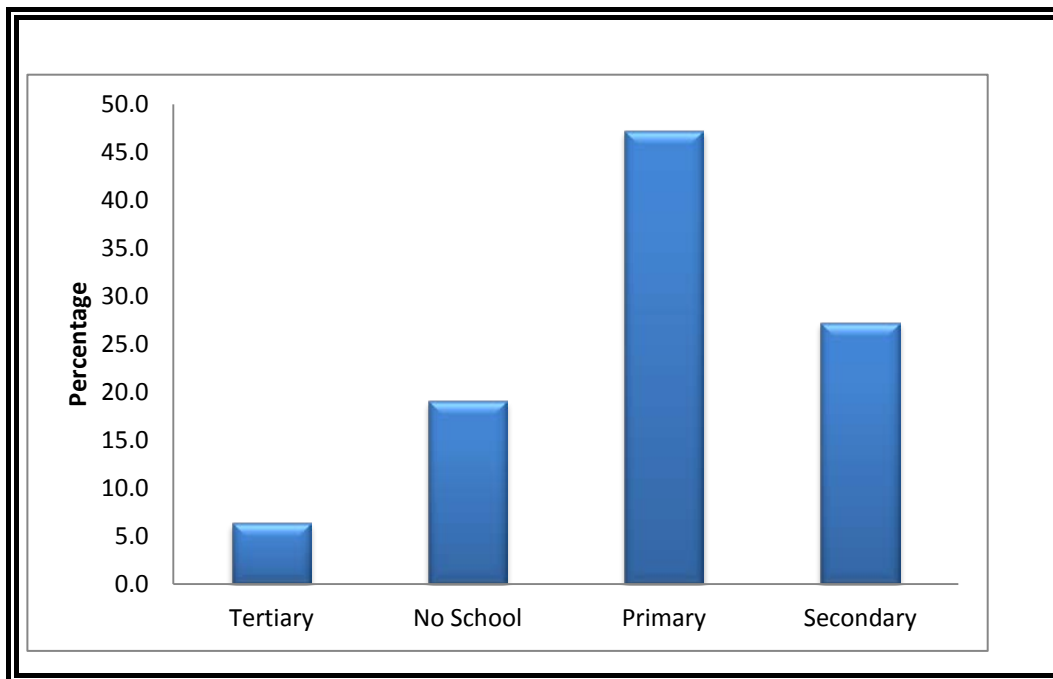


Figure 5: 2 Education levels of respondents

Source: Survey Results

Findings of this study also indicate that the average years of schooling among the respondents was six years indicating that most of the farmers had a low level of education. The trend of low education levels among farmers is mainly attributed to the fact that most of the farmers at the scheme were aged and have had limited opportunities to attain high educational grades as a result of prohibitive policies passed during the apartheid era.

5.2.6 Sources of household income

Income diversification into non-farm activities has come to be recognized as typical practice among rural households, (Obi, 2011). As shown in figure 4.4 by Davis and Pearce (2001), sources of income in rural areas can be classified into three categories namely on-farm income, off-farm income and transfers. Non-farm being all the income associated with wage work or self-employment. Own farm income refers to income from own agricultural activities (Obi, 2011).

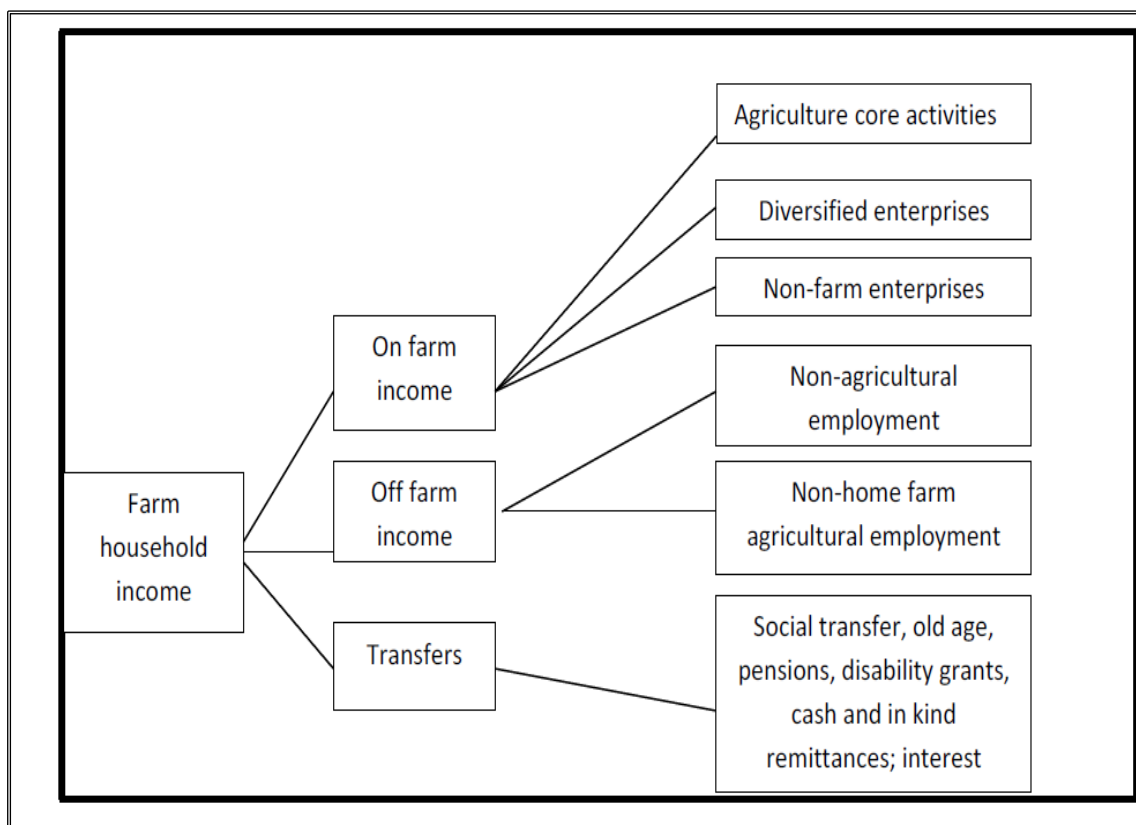


Figure 5: 3 Household sources of income

Source: Davis and Pearce (2001)

Like many rural households elsewhere farmers in Qamata are engaged in a wide range of economic activities as indicated in figure 5.4. The trend shown from the research findings indicate that most households (35 percent) rely on state social welfare grants as their main source of income demonstrating that grants still play an important role as a safety net in most rural households. The high proportion of respondents indicating social grants as their main source of livelihoods may also be attributed to the fact that the majority of the respondents in this area were old people above sixty years thus due for pension. Crops and livestock were indicated as the

second main sources of house hold income with 25 percent of the respondents apiece indicating them as a main source of income. This trend indicates that although the expectation was for most of the farmers on the irrigation scheme to depend mainly on crop production as their main source of income the situation has not been so; some of the farmers have continued on traditional sheep farming as a main source of livelihood.

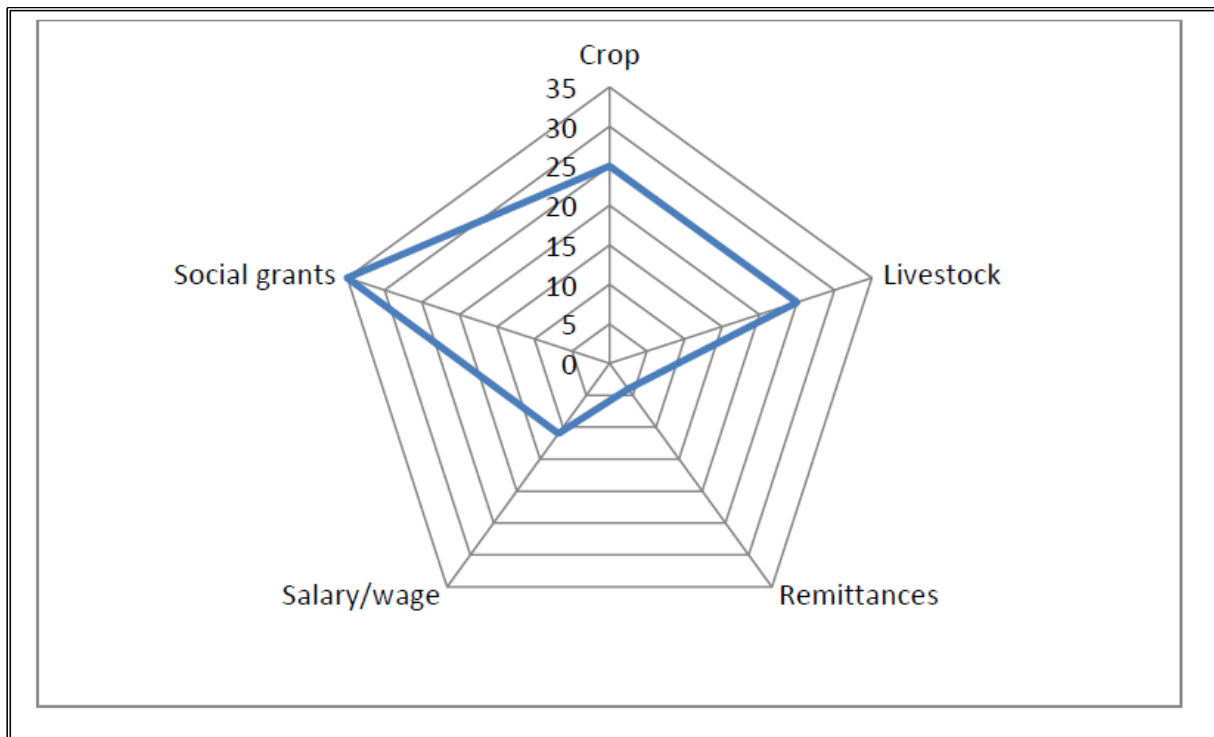


Figure 5: 4 Distributions of respondents according to their sources of income.

Source: Survey results

Wages also play a part on household income; 11 percent of the farmers mentioned wages as their main source of income, implying that a significant proportion of the respondents have continued to treat crop farming as a part time venture to supplement other main sources of livelihoods. Only 4 percent of the respondents indicated remittances as their main source of income and when compared to previous studies (Van Averbeké *et al*, 1998:116; Bembridge, 1984:248; Obi, 2011:79) this shows a decline in transfers as main source of income for rural dwellers. The farmers attribute the inability of the migrant workers to remit their households back at Qamata to the economic meltdown which has led to high living costs in urban areas and loss of jobs in most sectors of the economy.

5.3 Respondents motives for engaging in crop farming

Research findings indicate that 53.6 percent of the farmers engage in crop farming with the aim of selling their produce, while the remaining 46.4 % grow crops for mainly for consumption. However the prevalently subsistence nature of farming at QIS raises questions on the cogency of the farmers' crop farming objectives.

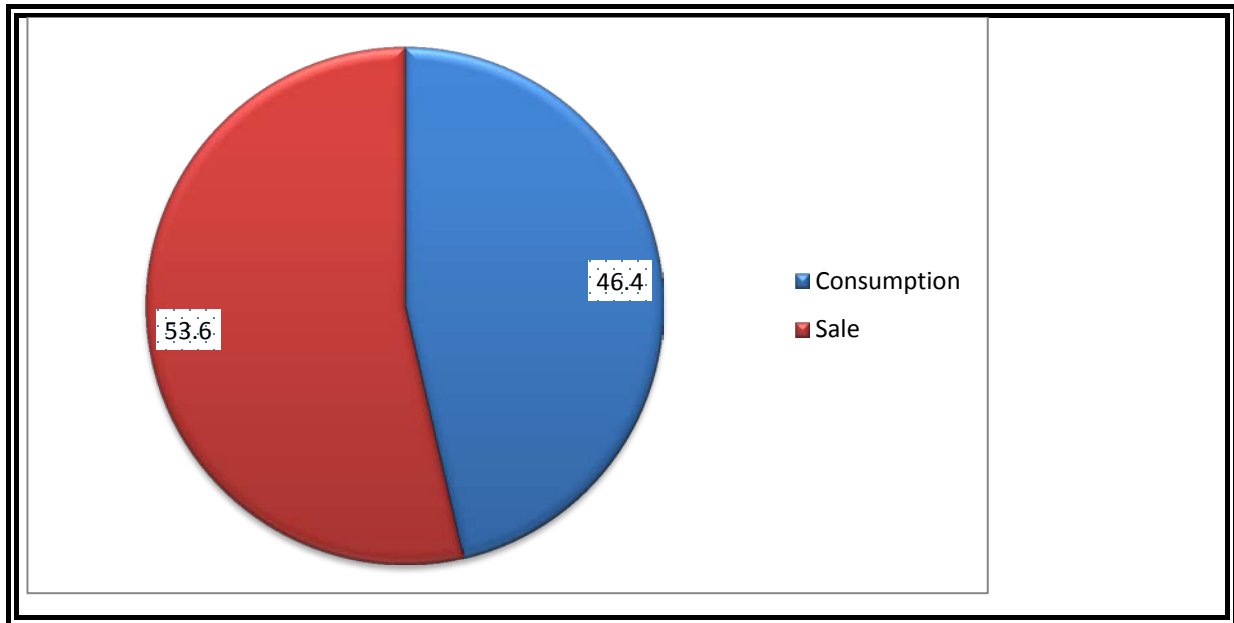


Figure 5: 5 Distribution of respondents according to their intentions in crop farming

Source: Survey results

Field visits conducted at different farming seasons at the scheme revealed that during most times of the year large tracts of land at the scheme were without any crop. Such observations conform with earlier reports by (Yokwe, 2005; Van Averbeke, 2008, Fanadzo *et al.*, 2010) which indicated a common trend of land underutilisation and poor cropping practices across smallholder irrigation schemes in the Eastern Cape province.

Albeit the low economies of scale in crop farming and the traditional tendency of one 'crop per season' by farmers, where farmers are not tapping the benefits brought about by irrigation, those 'few' farm produce from the irrigation scheme are often sold in the local markets in and around Qamata thus creating opportunities for local traders .



Figure 5: 6 Women selling fresh mealies on the road side next to the irrigation scheme.

Source: Survey Results

Though the scheme has created opportunities for vegetable vendors in the area the inconsistent supply of farm produce from Qamata irrigation scheme has seen road side vendors travelling to other distant farming areas in the province where they supplies will be readily available. The failure of the farmers to meet regular supply needs of the local fresh commodity traders clearly dismisses the overstated 'lack of markets' problem previously identified as one of the major setbacks for smallholder irrigation farmers.

5.4 Record keeping among farmers

Keeping track of what is happening on the on the farm enterprise requires some records. Good records do not ensure the farm will be successful; however, success is unlikely without them. Without written records, farmers have to depend on their memory when making decisions to modify their farm practices. Memories can become unreliable, particularly after a few days, months or years. Findings of the study indicate that record keeping was poor among the respondent farmers. As indicated in figure 5.4 only 17.3% of the respondent farmers kept records consistently, while 47.3% were inconsistent on record keeping .The remaining 35.4 % did not keep farm records at all.

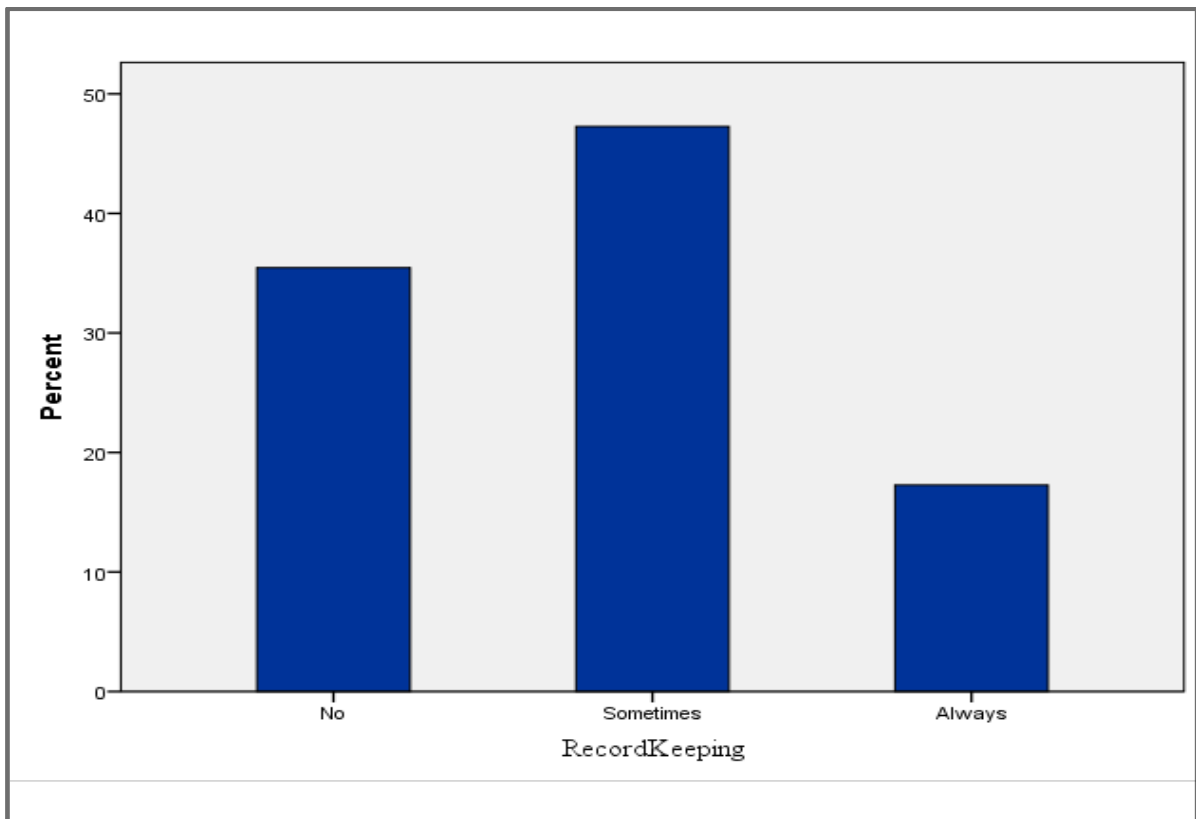


Figure 5: 7 Trend of record keeping among respondents

Source: Survey Results

Given the important role played by farm records in planning of agricultural operations and as tool for accessing credit, the poor record keeping trend among farmers at Qamata irrigation scheme can be a setback to the farmers' progression from subsistence to commercial farming.

5.5 Agricultural training

Training is the process of improving knowledge, skills and changing the attitude of an individual for doing a specific job. As the situation changes people also need to acquire the new knowledge, skills and attitude to cope up with the changing environment. For that reason, implementation of continuous farmer training can be an important device for entrepreneurship development. Figure 5.8 presents the statistics on the level of training among respondent farmers at Qamata Irrigation scheme.

From the research findings it can be noted that 45 percent of the farmers and plot-holders at the scheme had received some agricultural training while the majority, 55 percent had no agricultural training.

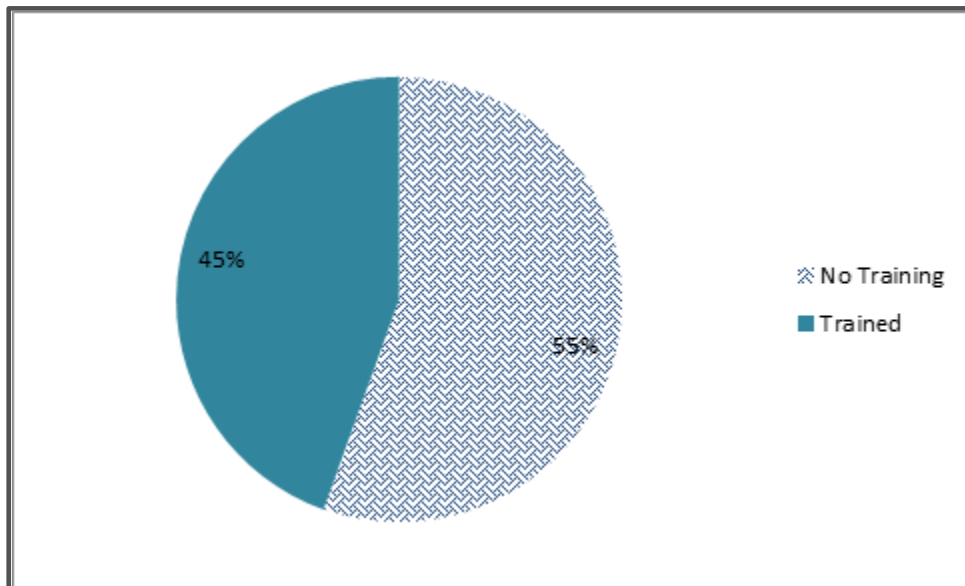


Figure 5: 8 Level of training among the respondents

Source : Survey results

The low levels of training among farmers in the study area can be attributed to the fact, in previous years the focus on improving performance of smallholder irrigation schemes had been centred on rehabilitation of infrastructure and little attention was given on improving farmer skills. Training is also hindered by the farmers' low levels of education which makes it difficult for them to use written information. Furthermore, the problem of low farmer training is exacerbated by the fact that most government extension facilitators working in the irrigation schemes are less equipped in terms of skills and resources needed to impart meaningful training on irrigation farmers.

5.6 Land tenure systems at QIS

Land tenure is the relationship, whether legally or customarily defined, among people, as individuals or groups, with respect to land. Land tenure is an institution, i.e., rules invented by societies to regulate behaviour (FAO, 2002). Rules of tenure define how property rights to land are to be allocated within societies. They define how access is granted to rights to use, control, and transfer land, as well as associated responsibilities and restraints. Land tenure is an important part of social,

political and economic structures. It is multi-dimensional, bringing into play social, technical, economic, institutional, legal and political aspects that are often ignored but must be taken into account (ibid, 7). Land tenure relationships may be well-defined and enforceable in a formal court of law or through customary structures in a community. Alternatively, they may be relatively poorly defined with ambiguities open to exploitation. As indicated by the results of the binary logistic model land tenure is a significant effect on the farmers' entrepreneurship. Figure 5.9; indicate the distribution of respondent farmers according to their land tenure system.

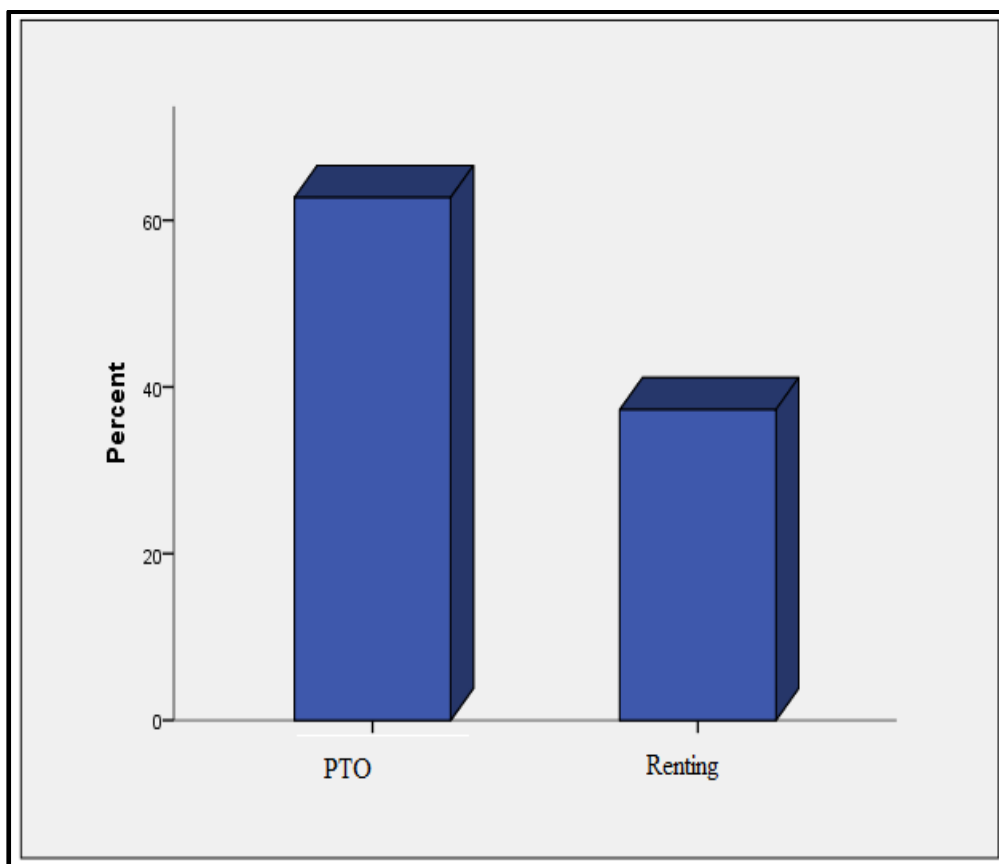


Figure 5: 9 Land tenure systems among respondents

Source: Survey Results

Land is dominantly used under Permission to occupy (PTO) tenure system with 62.7% of the farmers being in possession of PTO certificates. Personal consultations with farmers and extension officers in the study area indicated high levels of insecurity and uncertainty among plot holders who are in this land ownership arrangement. Despite passing legislation to improve tenure security of people

occupying communal land, May (2008) states that most of the attempts to improve tenure for black people in rural areas have made little if any progress.

Following past incidences where the government through the use of local authorities, repossessed underutilised land from plot holders (Manona, *et al* 2010), there is an increased tendency among plot holders to lease out some portions of their land to non-scheme members. Approximately 37.3 per cent of the respondent farmers were renting land from plot holders, albeit the absence of properly signed lease terms. In most cases land is leased at very low prices showing that the lease arrangements are not meant for commercial purposes but rather to safeguard land against repossession. As suggested by Bryceson (2000) most plot holders who rent out their land often turn to agricultural wage labour or other non-farm activities as a way of earning income in their rural economies.

5.7 Land sizes at Qamata irrigation scheme.

A survey conducted by (StatsSA, 1998) suggests that although 70 per cent of the population in former homelands has access to land, plot sizes for more than fifty percent of this group is less than one hectare. Although small land sizes have been attributed as having a contributing factor on the farmer's low productivity (Kadou, 2009; 232), research findings indicated a prevalent tendency of land underutilisation among the interviewed farmers. Results show that the mean plot size per farmer was 2.2 hectares and out of this only an average of 1.4 hectares was being utilised. Corresponding findings were also made by Fanadzo *et al.*, (2010), where irrigation farmers at Zanyokwe irrigation scheme in the Eastern Cape, failed to fully utilise their small sized land holdings, thus leaving additional land lying idle on the scheme. The same trend was also observed in Thabina irrigation scheme (Limpopo) where 42% of the total land area under irrigation was unused because the plot holders were not interested in farming (Perret *et al.* , 2003).

Consequently observations made in the study area thus resonate to an argument echoed by Kirsten and van Zyl (1998) that it is not the size of land that matters but rather the turnover or level of net farm income: For example, one hectare of irrigated peri-urban land, suitable for vegetable farming or herb gardening, has a higher profit potential than 500 hectares of low quality land in the Karoo.

5.8 Entrepreneurial behaviour of respondents

As already alluded in preceding chapters entrepreneurial behaviour comprised of eight components or indicators. In this section distribution of the respondents with reference to the various components of entrepreneurial behaviour and the overall entrepreneurial performance is presented.

5.8.4 Distribution of respondents on various components of entrepreneurial behaviour.

Farmer's entrepreneurial performance was assessed in eight components namely planning ability, risk taking, Cosmo-politeness, leadership ability, knowledge, decision making, innovativeness and achievement motivation. Based on the total scores obtained on each component, the respondents were classified into two categories (Low or High), keeping the mean and standard deviation as check. The itemization of data in this regard has been furnished in Table 5.3.

5.8.4.1 Planning ability

From the results in Table 5.3 it can be realized only 36.4% of the farmers were grouped under the high planning ability category while the majority (63.6%) of the smallholder irrigation farmers at QIS can be categorized as having a low level of planning ability. This trend can be attributed to the bureaucratic management system practiced during by the government of the former Transkei. During the homeland era parastatal organizations that were assigned to oversee the farming operations at smallholder irrigation schemes conducted all the farm planning processes side-lining the farmers and treating them as mere spectators in the whole farming episode. In a study conducted in the same locality Kadou (2009) attributed the poor education levels of irrigation farmers to be the main cause of the prevalent poor record keeping among the farmers.

Table 5: 3 Showing the farmers' distribution on their level of entrepreneurial behaviour

Variable		Level of entrepreneurship			
		High level (\geq Mean+ $\frac{1}{2}$ SD		Low level ($<$ Mean + $\frac{1}{2}$ SD)	
		Frequency	Percentage	Frequency	Percentage
Planning ability		40	36.4	70	63.6
Mean: 2.98	SD: 2.527				
Risk taking		57	51.8	53	48.2
Mean: 2.45	SD: 1.392				
Cosmo politeness		49	44.5	61	55.5
Mean: 1.45	SD: 0.672				
Leadership ability		42	38.2	68	61.8
Mean: 2.28	SD: 1.257				
Knowledge on farm practices		51	53.6	59	46.4
Mean: 3.58	SD: 1.737				
Decision making		66	60.0	44	40.0
Mean: 4.55	SD: 1.985				
Farmer Innovativeness		39	35.5	71	64.5
Mean: 2.07	SD: 1.290				
Achievement motivation		72	65.5	38	34.5
Mean: 5.16	SD: 2.336				

N=110

Source: Survey results.

5.8.4.2 Risk taking ability

Just like any business venture, agricultural enterprises encounter a lot risks and to obtain success farmers need not to be risk averse. The results from Table 5.3 indicate that a slight majority (51.8%) of the respondents had high risk taking ability with 48.2% having a low risk taking ability. Taking into consideration that risk taking is one of the main attributes leading to success of entrepreneurs the percentage of respondents with a low risk taking inclination can be of much concern.

5.8.4.3 Cosmo politeness

This aspect measured the connectedness to possible nodes of entrepreneurship outside their community (see appendix 1).The results showed that 55.5% and 44.5% of the respondents were categorized as having high and low level of Cosmo politeness respectively. From these results an inference can be made that only a small proportion of the smallholder irrigation farmers at QIS had some orientation outside the local community.

5.8.4.4 Leadership ability

Leadership is essential for the success of any businesses and farming is not an exception. It is apparent from the Table 5.3 that less than half of the respondents (38.2%) belonged to high level of leadership ability category with the majority of the farmers(61.8%) being categorized as having low leadership ability.

5.8.4.5 Knowledge of farming practices

The findings of the study show that 46.6percent of the respondents were having low knowledge levels while 53.6 percent had a high knowledge of farming. This trend is can be attributed to the fact that most of the interviewed farmers are highly experienced and have been on the scheme for many years. Despite showing high levels of knowledge the situation at QIS where most machinery lie abandoned without anyone to operate signifies a huge gap on the farmers' technical knowledge.

5.8.4.6 Decision making

The level of decision making ability among respondents was found to be high with 60% of the farmers being classified as having high decision making ability and 40% belonging to the low decision making category. The observed trend can be attributed to the introduction of Irrigation management transfer which saw the post-independence government of South Africa withdrawing support and control on farming operations in most SISs.

5.8.4.7 Farmer Innovativeness

As noted by Kahan (2013; 5) being innovative is an important quality for a farmer-entrepreneur, especially when the business faces strong competition or operates in a rapidly changing environment. Since its introduction about 10 000years ago, agriculture has under gone tremendous developments from earliest forms of traditional cultivation and domestication to the highly modernised practices characterising agriculture in the present era.

With new farming technologies being developed time and again, farmers need to move four speed ahead adopting new technologies and crop varieties in order to survive in the farming business. The observed level of farmer innovativeness in this study indicates that 64.5% of the respondents were categorised under the low innovative farmers' group with the remaining percentage of 35.5 being classified as highly innovative.

5.8.4.8 Achievement motivation

Heckhausen (1967) defined achievement motivation as the strive to increase or to keep as high as possible, one's own capabilities in all activities in which a standard of excellence is thought to apply and where the execution of such activities can, therefore either succeed or fail. In this regard questions asked to respondents were aimed at imploring the farmer's efforts and opinions on the future of their farming ventures. .A glance on table 5.3 indicates that 65.5% of the respondent farmers can be said to have a high level of achievement motivation with only 34.5% being treated as being less motivated for success. From these figures it can be inferred that

despite the prevailing discrepancies small holder irrigation farmers still have high hopes for future success.

5.9 General entrepreneurial behaviour of smallholder irrigation farmers

The farmers' overall entrepreneurial behaviour was computed as the summation of scores obtained on the eight components discussed in section 5.3. The total scores (ranging from 4 to 57) were then transformed using the Entrepreneurial Behaviour Index (EBI)

$$EBI = \frac{\sum_{i=1}^n SEV_i}{\sum_{i=1}^n MSEV_i} \times 100$$

Whereas, SEV – Score on entrepreneurial variables

MSEV – Maximum score on entrepreneurial variables.

i = 1 – n number of variables included in entrepreneurship.

Based on the obtained index values respondents were then grouped into two categories where would be labelled as either being highly entrepreneurial or less entrepreneurial. Mean and Standard deviation were used as a measure of check The observed trend on the entrepreneurial level of farmers is presented in Figure 5.10.

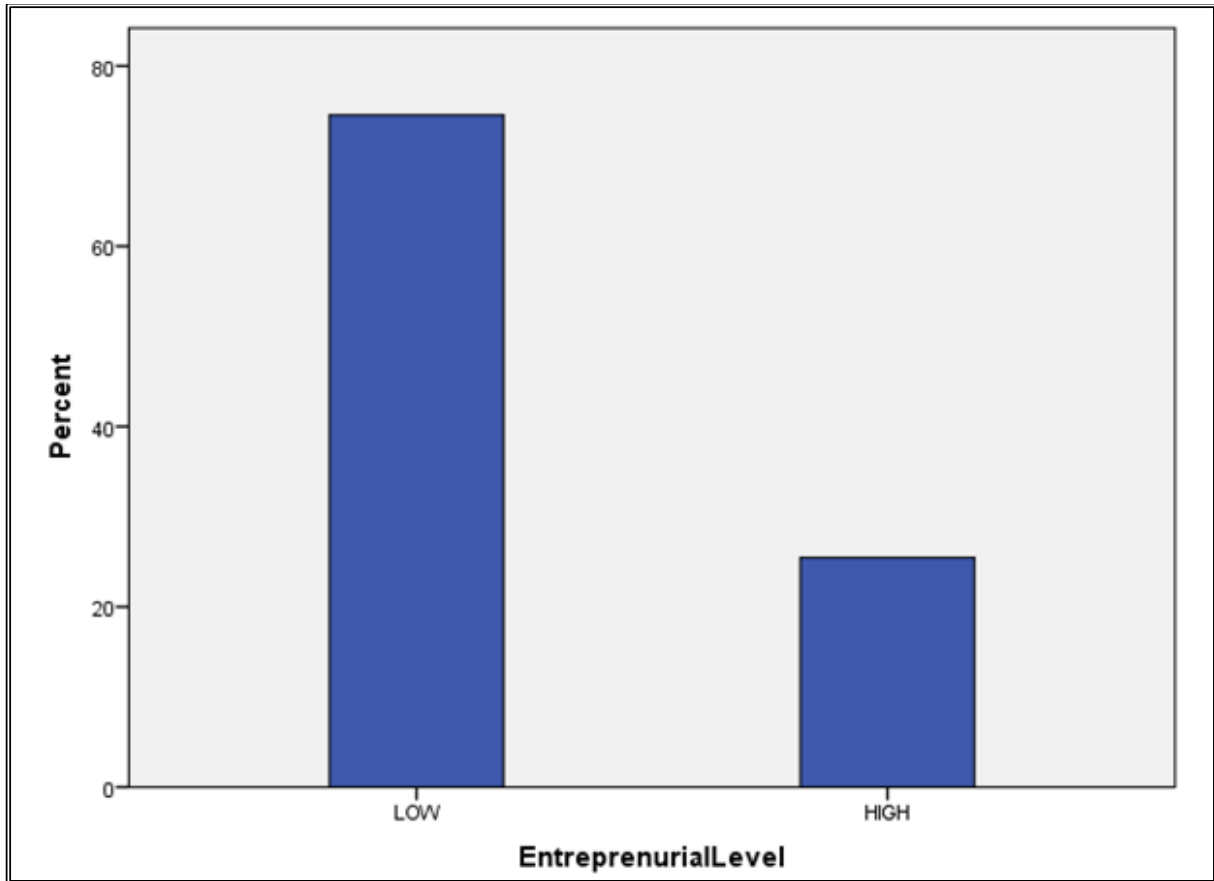


Figure 5: 10 Distribution of respondents according to their overall entrepreneurial behaviour

Source: Survey Results

With reference to results presented in Figure 5.10 it can be inferred that that the majority of respondents displayed low entrepreneurial behaviour. These findings correspond to those from an earlier research conducted in the same area by Agyekum (2009) which reported pervasiveness of low entrepreneurial skills among both dry land and irrigation farmers in Qamata area.as indicated in Figure 5.11 plot holders constituted the highest proportion of respondents with a low entrepreneurial behaviour score implying that plot holders have failed to utilise the ‘public good’ water to their advantage. Contrariwise non plot holders who in most cases are renting pieces of land on the irrigation scheme seem to have a high entrepreneurial propensity taking farming as a business and a possible source of income.

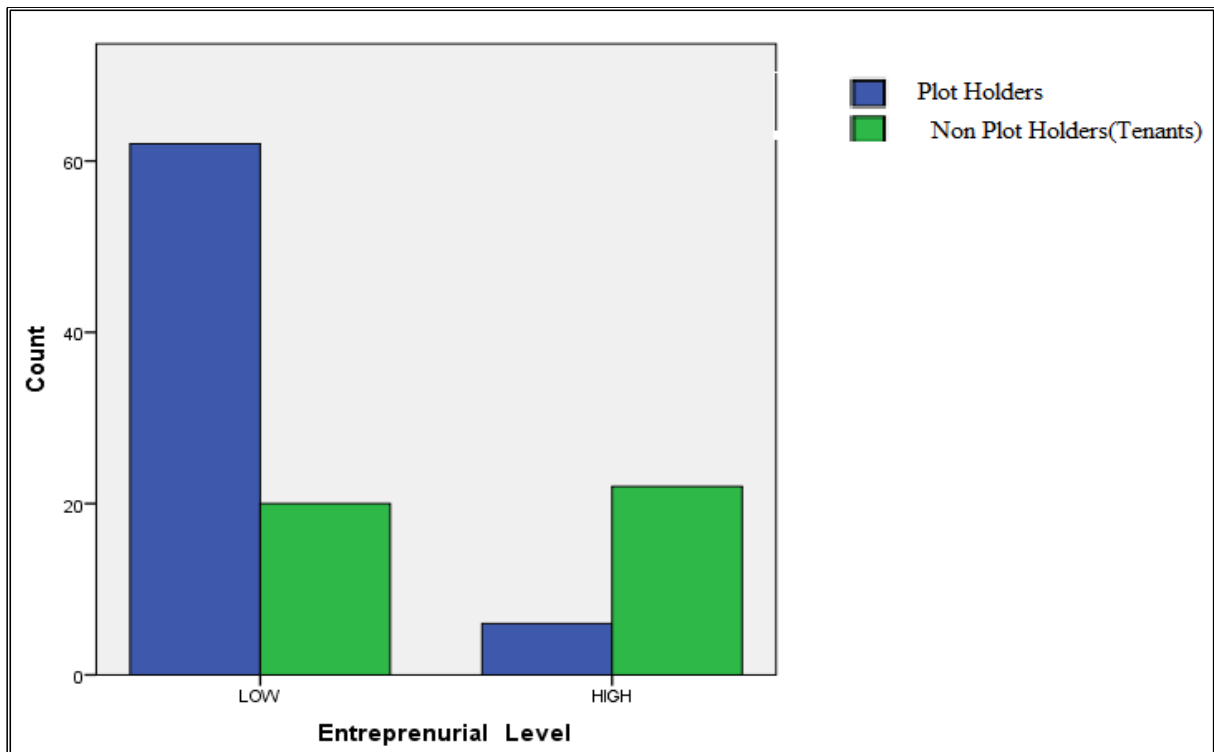


Figure 5: 11 Showing the entrepreneurial behaviour between plot holders and non-plot holders.

Source: Survey results

5.10 Empirical results on determinants of entrepreneurial behaviour

The binary logistic regression was preferred in analyzing data because the dependent variable was dichotomous, that is, high or low entrepreneurial behaviour. As stated earlier, entrepreneurial behaviour was taken as a function of eight components namely innovativeness, achievement motivation, and decision making ability, and risk orientation, leadership ability, planning ability knowledge of farming and Cosmo politeness. The summation of scores of all these eight components constituted the entrepreneurial behaviour score of the respondent.

The Omnibus Test of Model Coefficients, Hosmer and Lemeshow Test, the Nagelkerke R Square and Classification table outputs were determined for the assessment of the predictive power and the goodness of fit of the model. As noted by Pallant (2011).The Omnibus Tests of Model Coefficients gives us an overall indication of how well the model performs (Good ness of fit test).

In analysing the results a 95% confidence interval was used implying that for the p value to be significant it must be $p < .05$. In this case, the p-value is .000 at a Chi

square of 60.355 with 10 degrees of freedom. When the Omnibus Tests of Model Coefficients is statistically significant, it denotes that there is adequate fit of the data to the model and that at least one of the covariates is significantly related to the response variable.

Table 5: 4 A summary of the performance of the binary logistic regression model

Omnibus Tests of Model Coefficients		
Chi-square	Degrees of freedom (df)	Significance level (sig).
60.355	10	.001
Model summary		
-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
64.445 ^a	.422	.622
Hosmer and Lemeshow Test		
Chi square	Degrees of freedom (df)	Significance level (sig)
2.404	8	.966
Classification table Outcome	Before inclusion of predictors	After inclusion of predictors
	74.5%	86.4%

Source: Survey Results

The results shown in the Hosmer and Lemeshow Test in Table 5.4 also support our model as being worthwhile. According to Pallant (2011), this test is interpreted very differently from the omnibus test meaning that for the Hosmer-Lemeshow Goodness of Fit Test, good fit is indicated by a p-value greater than .05. In this case the model generated a Chi square of 2.404 with a p- value of 0.966 is >p-value .05 thus supporting the model. Similarly, the model generated a -2 Log likelihood of 64.445, Cox and Snell R Square of 0.422 and the Nagelkerke R Square of 0.622 suggesting that between 42.2 per cent and 62.2 per cent of the variability is explained by the set of variables included in the model.

Results of the classification table showed an improvement from the 74.5 % (before the inclusion of predictor variables) to 86.4% (after the inclusion of predictor

variables). As noted by Pallant (2011), a classification table provides an indication of how well the model is able to predict the correct category (Low entrepreneurship or High entrepreneurship). The outcome of the classification indicates that percentage accuracy in classification (PAC) was very high at 86.4%.

Table 5: 5 Empirical results for entrepreneurial behaviour

Variables	B	S.E.	Wald	Df	Sig.	Exp(B)
Gender	.415	.756	.302	1	.583	1.515
Age of head	-.118	.056	4.474	1	.034	.889
Marital status	-.318	.753	.178	1	.673	.728
Education level	.949	1.121	.717	1	.397	2.584
Land tenure	- 4.201	1.041	16.288	1	.001*	.015
Motive for farming	3.423	.893	14.681	1	.003*	30.661
Total farm Income	.023	.000	9.589	1	.002*	1.258
Training in farm management	1.049	.308	11.602	1	.001*	2.855
Information seeking tendency	2.043	.737	7.682	1	.004*	7.716
Farming experience	-.067	.063	1.124	1	.289	.935
Constant	- 2.001	2.470	.656	1	.418	.135

Key: * = Significant variable, B=Beta, S.E = Standard Error, Exp (B) =Odds ratio

As shown in Table 5.5, only five of the independent variables made a unique statistically significant contribution to the model (land tenure, motive for farming, farm management training, information seeking and total farm income).

Effects of individual's motive for farming on entrepreneurship

Motive for farming was the strongest predictor of entrepreneurial behaviour recording an odds ratio of 30.7. This indicated that respondents who had profit making as their main reason for farming were approximately 31 times more likely to show high levels of entrepreneurship than those who practice farming only to produce food for family consumption. Correspondingly Machete *et al* (2004) noted that farmers whose main source of livelihood is farming were more likely to take risk and participate in farmer organisations and pay for farmer support services.

Effects of land tenure on entrepreneurship

The results on land tenure indicate that the current arrangement where smallholder irrigation farmers have no title deeds land has a negative effect on entrepreneurship. As shown in table 5.3 negative β values of -4.201, indicate that an increase in the farmers with PTO (Permission to occupy) ownership arrangements will result in a decreased probability of the farmers having a high entrepreneurial behaviour. Manona *et al* (2010) notes that during the Bantu administration era several plot holders were evicted from the irrigation schemes for non-compliance with the conditions of the PTOs. With the majority of farmers at Qamata irrigation scheme holding land under PTO arrangements, the low levels of entrepreneurship by such farmers can be attributed to a lot uncertainties and suspicions emanating from the historical events.

Effects of farmer training on entrepreneurial behaviour

The resultant Wald value of 11.602 indicated that training is a strong predictor of the farmer's entrepreneurial behaviour. Kahan (2013; 88) noted that training in farm management can serve the needs of farmers by providing the knowledge and skills needed to select new farm enterprises and appropriate technologies. The β value of 1.049 indicates that an increase in farmer training will have a positive effect on farmers' entrepreneurial behaviour. Furthermore farmers who had received training in farm management were approximately 3 times more likely to demonstrate a high entrepreneurial behaviour than their untrained counter parts.

Effects of information seeking tendency on entrepreneurial behaviour.

The findings on information seeking tendency shows a positive beta value ($\beta = 2.03$) implying that respondents with a high score on information seeking were more likely to demonstrate a high entrepreneurial spirit when compared to those with less information seeking tendencies. Likewise, the model produced an odds ratio of 7.716 indicating that respondents with a high score on information seeking had a greater likelihood of being entrepreneurs than their counterparts.

Effects of total farm income on entrepreneurship

A study by (Singh, 1986) concluded that individuals with high levels of income were more likely to be entrepreneurs than those with low incomes. Income level had a p-value of <0.05 making it a significant determinant of entrepreneurship. Again, findings of this research indicate that respondent with more income were more likely to be to have high entrepreneurial behaviours as compared to those with low income as shown by the odds ratio of 1.258. A positive β value on total farm income also show that the more farm income farmers gets the more their likelihood of have a high level of entrepreneurship.

5.11 Chapter summary

This chapter presented the results of the study on the level and determinants of entrepreneurship among smallholder irrigation farmers. Findings of the study indicate that women farmers were the dominant and more active group in the study area. The majority of the respondents were aged with most of them in their sixties, and this can be seen as a contributing factor to the low entrepreneurship levels reported among these farmers. The binary regression model indicated that income, farmer's training, and motive for farming, networking and land tenure to be significant predictors of entrepreneurial behaviour. Empirical results also indicated the existence of a positive correlation between entrepreneurship and productivity. The succeeding chapter provides a detailed summary and give policy recommendations on the implications of the results obtained in this study.

CHAPTER 6

SUMMARY AND CONCLUSION

6.1. Introduction

This section provides a chronicled summary on the research findings regarding the entrepreneurial behaviour of smallholder irrigation farmer and the determinant factors for such behaviour. In line with the third research objective, recommendations to address the outcome and short comings of the research are also outlined in succeeding subsections. Finally an overall conclusion to the study is provided.

6.2. Research Summary

To establish the respondents' entrepreneurial orientation this research focused on both the cognitive and the demonstrated behaviour patterns with regard to irrigation farming. The survey results provide a worrying trend on the entrepreneurial behaviour among smallholder irrigation farmers. The entrepreneurial behaviour of the farmers was found to be generally low and the majority of the respondent farmers can be said to be farming for subsistence purposes with very few farming for profit. Notwithstanding the high levels of hope noticed among the farmers, observed low entrepreneurial performance on other aspects such as the farmers' planning, leadership and innovativeness are a matter of concern.

The study also revealed that entrepreneurial behaviour is a function of various interlinked factors. The prevailing land tenure system in the name of PTOs has been figured out as a major deterrent factor on the farmers' entrepreneurship. Respondents with a high information seeking behaviour had more likelihood of becoming entrepreneurs thus indicating the importance of farmer networks and information centres on ensuring successful entrepreneurial development among smallholder irrigation farmers. On farm income, the mean farm income was generally low and only a few farmers indicated crop farming to be their main source of

household income. As indicated by the binary model the few farmers who had high levels of income were likely to be more entrepreneurial than those with less farm income.

6.3. Areas for future research

The concept of entrepreneurial behaviour is a constellation of many components and several authors have used different approaches to study this concept. Considering that the focus of this survey was only on eight indicators of entrepreneurial behaviour there is need research further on personality traits such as locus of control and self-efficacy. More studies also need to be conducted on this and other smallholder irrigation schemes to provide a comprehensive understanding and informed comparisons on entrepreneurial inclination among different farmer groups. Several researches have established the existence of an interconnection between culture and entrepreneurship, this research fell short on establishing this link, thus there is need to conduct future research focusing mainly how the farmers' cultures affect their entrepreneurial spirit.

6.4. Policy Implications and Recommendations

In the light of findings of the study and from the personal experience of the researcher at the time of interviewing the respondents, following inferences and recommendations are made for the concerned extension and field level personnel, administrators and policy makers for the improvement of entrepreneurial behaviour among smallholder irrigation farmers:

- Considering the challenges posed by the prevalently low entrepreneurial behaviour of farmers to the development of the rural economy, there is need for the implementation of comprehensive entrepreneurship development programs among the smallholder farmers. Such programs, apart from concentrating on entrepreneurial awareness, training and credit reach to farmers must also concentrate upon bringing the new technology within the reach of farmers and acquaint them with the new avenues of entrepreneurship.
- Despite the need for intensive farmer training having been raised in the past years, the proposition seems to have remained academic and unless qualified

local staff is available to do it the problem of farmer training will remain a challenge. Furthermore the available extension personnel are always trained in basic agricultural practices with the component of entrepreneurship almost non-existent in their curriculum. In this regard the government needs to come up with an intensive farm entrepreneurship programme. For the success of such a programme the first point of call should be on equipping the extension officers with sufficient training on entrepreneurship thus making them able to orient farmers into becoming successful entrepreneurs.

Considering the effect of high illiteracy levels on the farmers' basic entrepreneurial skills such as record keeping and production planning, the need for an intensified adult literacy programme on smallholder irrigation schemes must also be taken into consideration. If the improvement of farmer literacy levels is timeous then agricultural training can be conducted using low –literacy farmer training methods.

- As already highlighted, most of the farmers had low innovativeness. It means, still there is a need to expose the farmers to recent developments in agricultural technologies and motivate them to adopt the new technologies by organizing group discussions, meetings, study tours and field trips. Another way of promoting farmer innovativeness is by making them join commodity associations where they will receive regular technical and specialized agricultural support services.
- The current land tenure system characterising land ownership at Qamata irrigation scheme and other smallholder irrigation schemes in former homeland areas has also been identified as a major hindrance to entrepreneurial development. Government through the department of land reform and rural development need to introduce a prudent land tenure system which guarantees tenure security among farmers. Scheme farmers should have a title-deed to their irrigated plots, provided, of course, that strict regulations protect them from the dangers of mortgaging their land to money-lenders and middle-men once the irrigated land has become a marketable property.

- Promoting farmer diversification into agro processing ventures as a way of adding value to farm products. This can also be reinforced through the formation of partnerships with established agro dealers and retail outlets. The establishment of long term partnerships between QIS and such institutions can be an effective way to ensure that they work in close collaboration with each other in all areas attributed to the agribusiness chain thus strengthening communication and cooperation between the farmers and these institutions.
- Finally government leaders need to rise above political rhetoric and formulate realistic policies that can create diversified enterprises with a potential of turning rural areas into economic hubs.

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APPENDIX I

University of Fort Hare: Department of Agricultural Economics and Extension

FARM LEVEL SURVEY QUESTIONNAIRE: *An analysis of the entrepreneurial behaviour of farmers at Qamata Irrigation Scheme.*

Questionnaire number Name of Interviewer Local Municipality
 Village Member of Irrigation Scheme

A. PERSONAL INFORMATION

A.1.	A.2.	A.3.	A.4.	A.5.	A.6.	A.6.	A.7.	A.8.	A.9.
Position in family	Sex 1 = Male 2=Female	Marital Status 1= married 2=single 3=Divorced 4 =widow 5= cohabiting	Age)	Education level 1=Primary 2=Secondary 3=Tertiary 4= None	No of years in School	Type of Occupation 1=Farmer 2=Farm laborer 3= trader 4=casual work 5=civil service 6=private firm 7= student	No of year employed in the named occupation	No of years farming	Full time farming 1=YES 2=NO

B. HOUSEHOLD CHARACTERISTICS.

B.1.	B.2.	B.3.	B.4.	B.5.	B.6.	B.7.
Gender of Household head	Household size (Eat and sleep under one roof)	No of children	Number of Household members receiving Monthly wage	Number of Household members receiving grant	Number of House hold members unemployed	Number of Household members working outside the district
1= male						
2=female						
B.8. Main sources of income for the household in order of importance				1	2	3
				4	5	6

C. LAND USE AND PREPARATION

C1: Land Use

C.1.1.	C.1.2.	C.1.3.	C.1.4.	C.1.5.	C.1.6.			C.1.7.
Type of plot 1-Homegarden 2-Irrigated land 3-Dry land	Size (hectares)	Size currently under use (hectares)	Tenure system 1-PTO (communal) 2-Freehold/Private 3-Rented 4-Other(specify)	Time for which tenure has been held (years)	Fees (For water & for land)1=Yes 2=No			Laws governing land use 1=yes 2=No
					LAND			
					WATER			

C2. Land preparation for the 2012-2013 farming season

C.2.1.	C.2.2.	C.2.3.	C.2.4.
Implements used to prepare land 1=tractor 2=hand tools 3=Animal Drawn Implements	Where did you get implements for land preparation 1= Own 2=Provided by CHDM/Agric Dept 3=Hired	Reliability of Farm implements 1= always available 2=sometimes 3=Never available	Any delays in land preparation due to late availability of implements 1=Yes 2=No

D. IRRIGATION PARTICIPATION AND WATER USE

D1	D2	D3	D4	D5	D6	D7		
Years on Scheme	Number of Family members owning a plot on the scheme	Reliability of irrigation water	Cropping frequency for the past year	How have you been using income obtained from irrigated crops?	How often do you experience broken irrigation equipment	Does the broken equipment get fixed on time		
		1=always available 2=sometimes available 3=never available	1= Twice 2=Once 3=No crops grown	1=build a house 2=pay school fees 3=buy food 4=purchase household assets	1=Very often 2=Rarely 3=Not at all	1=Yes 2=No		
D.8. Are you better off Now than before you joined the scheme?			D.9. State the size of your plot		D.11. Do you use all the land for cultivation?			
1= Yes	<input type="checkbox"/>	2=No	<input type="checkbox"/>	1=Yes	<input type="checkbox"/>	2=NO	<input type="checkbox"/>	
			D.10. Are you satisfied with your plot size?				1 = lack of capital:	<input type="checkbox"/>
			1= Yes				2 = lack of labour:	<input type="checkbox"/>
			2=No				3= rented to others:	<input type="checkbox"/>
							4 = land is resting:	<input type="checkbox"/>
							5 = old age/sick	<input type="checkbox"/>

E. PRODUCTION INFORMATION (July 2012- September 2013 farming season)

E.1.	E.2.	E.3.	E.4.	E.5.	E.6.	E.7.	E.8.	E.9.		
Crop	Cropped Area (hectares)	Qty Produced	Qty sold	Qty Consumed	Quantity given out as a donation	Unit 1 =Kg 2=bag	Unit price	System 1= Rain fed 2=irrigation 3=Both		
1)Maize								E.10.Frequency of cropping.		
2) Cabbage										
3)spinach								1=Once in a Year	2=Twice in a Year	3=Thrice in a Year
4. Carrots										
5.Butternut										
6. Potatoes										
E.11. Who supplies you with inputs (fertilizers, seeds, etc.)?					1. Own from Retailers	3=Other farmers/relatives				
					4=CHDM	6=Other()				

E.12. PRODUCTION AND MARKETING COSTS for crops mentioned in E 1.

CROP	Labour cost	Input cost(fertilisers,seed,agrochemicals)	Marketing cost	Total cost
1)Maize				
2) Cabbage				
3)Spinach				
4. Carrots				
5.Butternut				
6. Potatoes				
1)Maize				

F. FARMERS' ENTREPRENEURSHIP

F.1. FARM DECISION MAKING

The following are some of the management decisions which you might have taken while growing the crops. Please indicate the appropriate justification for taking each decision in your case.

Decision	Justification
1. How did you decide on the crop/varieties in the last season?	<ol style="list-style-type: none"> 2. I just grow what was there 3. Selected crops that I already had good experience from previous years. 4. Selected crops that had high returns in the market.
2. Who decides on the timing of farming activities (ploughing and planting)?	<ol style="list-style-type: none"> 1. Government extension workers 2. Self/Farm manager/Head of household 3. Follow Culture/tradition
4. How did you decide the quantity of fertilizers used on your crops?	<ol style="list-style-type: none"> 1. Just applied the same amount as in previous year/Just used what was at hand. 2. Used general experience to determine the quantity to be applied. 3. Conducted soil tests before deciding on the quantity to use.
4. Who makes decisions on the type of crops to grow on your plot?	<ol style="list-style-type: none"> 1. Anyone in the family 2. Government extension workers 3. Head of household/Farm manager 4. Follow culture /tradition
5. How did you decide the time of marketing of your produce?	<ol style="list-style-type: none"> 1. Just sell immediately after harvest without making any considerations. 2. By following other farmers/relatives. 3. Considering market rates and perishability of produce.

F.2. ACHIEVEMENT MOTIVATION

A set of statements are given below representing the achievement motivation of farmers. Please express your feelings about these statements by indicating the degree of your agreement or disagreement on the three point continuum.

STATEMENT	Agree (2)	Undecided (1)	Disagree (0)
1. Work should come first even if one cannot get proper rest in order to achieve ones goals			
2. One should always be content with his achievements	0	1	2
3. One should always aim higher even if resources are limited			
Score			6

F.3. LEVEL OF ASPIRATION

1. Where do you think your business will be two years from now?					
0	Worse than current	1	Same as current	2	Better than the current state
2. Do you have any dream of erecting a packaging house or a processing plant on your plot?		2.Yes	1. Sometimes	0.No	
Score			4		

F.4. INNOVATION

STATEMENTS	YES(1)	NO(0)
1. Have you ever adopted any improved crop varieties in the last 2 years?		
2. Have you used any new pesticide in the past 2 years?		
3. Have you tried any new farming method in the past 3 years e.g. intercropping		
4. If yes did you adopt the farming method?		
5. Have you made any improvements on your farm since you started your farming operations?		
Score		5

F.5. Planning ability

	0	Never	1	Sometimes	2	Always
1. keep farm records						

2. How often do you conduct production forecasts			
3. Consultation of experts in advance before planting			
4. Estimation of financial capital requirements			
5. Preparation of a calendar for your farm operations			
Score			10

F.6. KNOWLEDGE OF FARMING ENTERPRISE

Statement	No (0)	Yes (1)		
1. Do you know the plant population per hectare of the following crops?				
Maize				
Cabbage				
Sugar beans				
2. Do you know the recommended dose of NPK fertilizer to apply on maize?				
3. Do you have knowledge of the crops to be included in a crop rotation cycle?				
4. Do you know the names of any herbicides that are used in maize/cabbage?			Score	
5. Do you have a crop protection programme on your farm?				7

F.7. LEADERSHIP ABILITY

Farmer has to take decisions for getting the things done, initiate the action, and motivate the followers. The statements related to this aspect are given below. Please indicate your response on a continuum (0-2)

	Statement	Never (0)	Sometimes (1)	Always (2)		
1	Did you participate in group discussions on new farm practice?					
2	Whenever you see/hear about a new farm practice did you initiate discussion about it with your colleagues?					
3	Do village people regard you as a good source of information on new farm practices?					
4	Do you assign the farm work to your family Members?					
Score						8

F.8. COSMOPOLITANISM

Please give your response regarding the following statements pertaining to Cosmo politanism

1. Are you a member of any organization outside your village?	Yes(1)	No(0)
2. Do you go to nearby town to meet officials to seek information related to your enterprise?	Yes	No.
3. Have you lived outside your village for a year or longer in the past?	Yes.	No

4. Have you ever attended an agricultural exhibition outside your village in the last 2 years	Yes	No	
	Score		5

F.9. Information Seeking

How often do you seek /access farming information from the following sources	Always 2	Sometimes 1	Never 0
1. TV			
2. Radio			
3. Agricultural magazines			
4. Subject matter specialists /Extension officials			
			8=Total score

F.10. RISK TAKING ABILITY

Statement	Yes (1)	No (0)
1. Farmers must solely finance their operations with limited support from government.		
2. Have you ever tried new farming methods which other farmers had not yet used?		
3. Do you conduct market research before deciding on the crop to grow?		
4. Are you willing to borrow money to invest in farming?		
5. Will you be willing to sign a contract of individually supplying retail shops in your area with your produce?		
	Score	5

G. GENERAL INFORMATION

G.1. Does the community benefit from the Scheme?	1=YES	2=NO	G.8. Has your status in the community improved Since you joined the scheme?	1=YES	2=NO
G.2. What is the main form of labour used at your farm 1=Hired Labour 2=Family Labour			G.9. Has your food situation improved since you joined the scheme?	1=YES	2=NO
G.3. Do you employ any permanent workers on your enterprise?	1=YES	2= NO	G.10. Do you face any challenges in your farming enterprise?	1=YES	2=NO
G.4. If yes indicate number of permanent			IF yes indicate the problems you are facing in order of importance	1=YES	2=NO

workers currently employed		1			
G.5. Do you employ seasonal workers at your enterprise?	1=YES	2			
	2=NO	3			
G.6. Do you have any access to credit?	1=YES	G.11. Do you engage services of private extension specialist /consultants	1=YES		
G.7. If NO give a reason	2=NO		2=NO		
1=Don't need any credit 2=High interest rates 3=No collateral 4=Other (Specify)		G.12 Comment on your reading and writing skills			
		English		IsiXhosa	
		Write	Read	Write	Read
		Poor			
	1=Yes 2=No	Fair			
		Good			

THANKING YOU FOR ALL THE TIME