

**Rural households' livelihoods strategies and opportunities with regard to farming: a case of
Intsika Yethu Local Municipality**

By

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Declaration

I, Lungile Sivuyile Gidi (Student Number: 200700241), the undersigned, hereby certify that, unless specifically indicated to the contrary in the text, this thesis is the result of my original work and that to the best of my knowledge and belief, it contains no material previously published or written by another person that has not been duly acknowledged. Further, it does not contain any material which has been accepted for the award of any Degree of the University of Fort Hare or any other institution of higher learning.

Signature.....

Date.....

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Dedication

To my family

Abstract

South Africa and other developing countries are grappling with high levels of poverty as a result of slow to negligible rural development. Irrigation development is one essential component that can be used to address the challenges faced by smallholder farmers in rural areas. In the President's "State of the Nation Address" in 2011, the President of South Africa outlined measures to reduce hunger and poverty in communal areas through enhanced government's expenditures in rural infrastructure developments, especially for such amenities as irrigation and roads, with a view to promoting food security. The broad objective of this study is to assess livelihood strategies and opportunities with regard to farming in Qamata area of Intsika Yethu Local Municipality. The stratified random sampling method was applied in order to choose a sample of 70 household that were interviewed by means of semi-structured questionnaires. Out of these, 53 belonged to the irrigation project and 17 farmers were non-irrigation farmers. The results show that women play an active role in agriculture. The Multiple Regression model was used to assess the relative importance of different livelihood strategies adopted by both irrigation and non-irrigation farmers in improving household food security and welfare in Qamata. More specifically, the study assessed the impact of different livelihood strategies on production of butternut, goats, maize and poultry (Chicken) in Qamata. The results show increased agricultural production, crop diversification and higher incomes from irrigation farming as compared to dry land farming. Irrigation farming has enabled many households to diversify their sources of income and therefore include activities and enterprises that contribute to enhanced household welfare. The study showed that household size is crucial in crop production, followed by gender of the household head. The government and research institutes need to come up with programmes to train people on ways to produce crop and livestock products more efficiently.

Keywords: Qamata; households; Livelihoods strategies; irrigation farmers and crop and livestock production.

List of Abbreviations and Acronyms

CARE-CARE international

DAFF- Department of Agriculture, Forestry and Fisheries

DBSA-Development Bank of Southern Africa

DFID- Department for International Development

DLA-Department of Land Affairs

DoA-Department of Agriculture

FAO-Food and Agricultural Organization

GDP-Gross Domestic Product

IFAD- International Fund for Agricultural Development

MDG- Millennium Development Goals

QIS- Qamata Irrigation Scheme

SABC-South African Broadcasting Corporation

SADC- Southern African Development Community

SSA- sub-Saharan Africa

UNDP-United Nations Development Programme

USDA- United States Department of Agriculture

WB- World Bank

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CHAPTER 1

INTRODUCTION

1.1 Background of the study

“A household refers to a group of people who eat from a common pot, and share a common stake in perpetuating and improving their socio-economic status from one generation to the next”(FAO, 2005). Livelihood is defined as comprising “the capabilities, assets (including both material and social resources) and activities required for means of living. A livelihood is considered to be sustainable when it can cope with and recover from stress and shocks and maintain or enhance its capabilities and assets both now and in the future, while not undermining the natural resource base” (Carney, 1998, 2002; DFID 1999). According to Carney (1998), a livelihood relates to the assemblage of activities, capabilities and assets required for people to make a living. Livelihood strategies are then defined as the combination of activities that people choose to undertake in order to achieve their livelihood goals (DFID, 1999). Ellis (2000) clearly defined livelihood strategies as the overarching term used to designate the range and combination of activities that individuals or households undertake in search of their livelihoods. The line of argument given by this scholar about a definition of livelihood strategies depicts the composition of activities that generate the means of household survival.

The analysis of livelihood strategies is of special interest to rural development policy (Barret & Swallow, 2005). Livelihood assets (capital assets) refer to human and non-human resources (natural, physical, and human, social and financial) upon which livelihoods are built and to which people need access. The assets constitute a stock of capital that can be stored, accumulated, exchanged or allocated to activities to generate a flow of income or means of livelihoods or other benefits (Rakodi, 1999). ‘Capital’ and ‘assets’ are normally used interchangeably by scholars. Livelihood outcomes are the achievements or outputs of livelihood strategies. Livelihood outcomes may be expressed in terms of increased income, improved well-being, reduced vulnerability, or improved food security, for example.

The focus of this study is to assess rural households’ livelihoods strategies and opportunities with regard to water usage and farming in Intsika Yethu Local Municipality. Intsika Yethu Local

Municipality is an administrative area in the Chris Hani District of the Eastern Cape in South Africa. Intsika Yethu is an isiXhosa name meaning “our pillars”. The municipality leaders decided on the name because of the trust the community has in the municipality in terms of service delivery and in related issues. There are three broad rural livelihood strategies that have been identified by several scholars namely, agricultural intensification or extensification, livelihood diversification and migration (Scoones, 1998; Hussein & Nelson, 1998; Swift & Hamilton 2001). Agricultural intensification aims at more output per unit resource, be it land, water, vegetation or livestock, by applying more labour, capital or technology. Agricultural extensification aims at expanding the resource base being utilized. This can be by increasing the area under cultivation or by increasing livestock herds, whilst simultaneously raising levels of labour, capital or technology to maintain productivity (Tiffen, Mortimore & Gichuki, 1994; Zeller, Lapenu, Minten, Ralison, Randrianaivo and Randrianarisoa, 2000; Ellis, 2000; Ntshona, 2004). Livelihood diversification on the other hand, refers to the strategy of households creating an increasingly varied range of activities and assets in order to make ends meet or improve their living. Typically this involves expanding the range of either on-farm or off-farm sources of income and migration (Ellis *et al.*, 2000; Barret *et al.*, 2001).

The main issue that can be considered is the mapping of the livelihoods profiles of the farming households. In this case, the sustainable livelihoods framework could be employed to identify the livelihood strategies of the households, their resources and assets to implement those strategies, and find out the livelihoods outcomes that relate to those strategies and assets. The standard frameworks developed by DFID, CARE, and UNDP will be modified and applied (Ellis, 2000). Livelihood diversification strategy is essential for this study and it specifically seeks to examine the extent of income diversification by rural households as one of the livelihood strategies that they are likely to employ in order to make ends meet or improve their living standards.

Available irrigation schemes for crop farming by small scale farmers around Intsika Yethu Local Municipality will give a clear indication of the water usage in the farming system in terms of patterns and extent. This is because crop production usually requires some form of irrigation. Traditionally, small scale farmers depend on erratic rain-fed agriculture, and are therefore severely affected by water shortages in view of the semi-arid conditions that characterize the country as a whole. Water storage and reticulation are important in supporting various aspects of

farming, including crop irrigation support. The study adopts the livelihood framework as the main theoretical approach to highlight the extent to which the rural poor in the Intsika Yethu Local Municipality are sustaining their living through the resources they have (water) and the role of government intervention in crop production projects.

1.2 Problem statement and Justification of the study

South Africa has invested substantially in smallholder irrigation to benefit smallholder farmers in the less developed areas. There are more than 200 small-scale irrigation schemes in the country irrigating about 50 000 hectares and providing income to over R37 000 Million. However, this production is not as intensive as needed and often involves production of low-valued food crops which do not even meet subsistence food requirements. At the same time, poverty has been worsening in recent years as the unemployment rate has increased. The small proportion of the population that remains in farming concentrate on subsistence production and the available statistics suggests that only 37 percent of farmers can be considered commercially oriented (Backeberg, Bembridge, Bennie, Groenewald, Hammes, Pullen & Thompson, 1996). The recent food price increases that have affected many regions of the world seem to have made matters worse and the population has been showing signs of discontent that have culminated in incessant protests over wages. There is hardly any doubt that the general population is hungry and naturally becoming very angry as expectations for livelihood improvements under a democratic dispensation seem to have not been met.

While the situation varies from province to province, there is evidence that Eastern Cape is particularly worse off than most provinces of the country. Although some households in the province do not regard farming as a potential source of livelihood, in Qamata agricultural production remains the major livelihood strategy of many households (Kodua-Agyekum, 2009). The former Transkei has a higher average arable land holding size per household compared to other former homelands in South Africa (Porter & Phillips-Howard, 1997). In addition to the relatively larger land availability, households at Qamata enjoyed access to a small-scale irrigation scheme to boost productivity for improved livelihood through increased household incomes, employment and poverty reduction. However, most households are abandoning their agricultural land which exposes them to low agricultural output, food insecurity, unemployment

and high poverty levels. Further, this has led to high dependence on male migrant remittances in the former Transkei compared to other former homelands.

In his State of the National Address in 2011, President Zuma proclaimed that the government was to develop infrastructure that will boost the agricultural sector, while also helping to create jobs (Government of South Africa, 2012). As part of the Zero Hunger Campaign in April 2012, the President also visited the Eastern Cape and emphasised government support programmes to subsistence farmers in rural areas as a development initiative through provision of livestock and tractors. Also the Zero Hunger Campaign aims at revitalizing irrigation schemes to boost agricultural productivity (SABC News, 2012). However, these programmes have attracted less attention of rural farmers' perception about agriculture's potential to lift them out of poverty. Therefore, this may call for understanding of the factors preventing farmers' progress towards agricultural development for improved household livelihoods of Qamata community. It needs to be understood why the rural dwellers in the municipality and this relatively well-endowed community are not taking advantage of the favourable government policies and programmes to expand their landholdings and get out of poverty.

Muchara (2011) has observed instances of sub-optimal water utilization on irrigation schemes as well as individual plots in some parts of the former Transkei homeland area, suggesting that the problem is not solely one of insufficient access to this vital resource. With the economic value of water increasing as food prices rise further and real wages decline, the need to improve rural households' livelihoods strategies of Intsika Yethu and to alleviate poverty through smallholder irrigation becomes more desperate and urgent.

There is therefore a need for research to assess the empowerment of people in rural areas of Intsika Yethu Local Municipality, supporting sustainable farming activities such as homestead food gardening to smallholder irrigation farming, and improving rural households' livelihoods in Intsika Yethu Local Municipality. This can be attained by developing procedures, methods and models to provide assistance to small scale irrigation farmers on the best management practices and the optimal crop production processes and techniques within the constraints of available water resources. However, for such interventions to be effective, it is necessary to start by

assessing existing livelihood strategies and opportunities with regard to farming. This study used both descriptive and inferential statistics to describe the role played by agricultural production in enhancing rural household livelihoods and the main socioeconomic characteristics of rural households in Qamata that affect farming as source of livelihood. The rural households of the Qamata village are poor in terms of both income and assets. As a result, they tend to depend on the combination of different strategies for their livelihood. These strategies include agricultural production, social grants and remittances. The government needs to play an important role in improving extension services to rural communities and also provide support in terms of loans, machinery and land to small holder farmers. People need to be educated more about agricultural activities so that they can participate in farming to improve their incomes and be food secure. Eastern Cape is one of the poorest provinces in South Africa and exhibits serious income inequality (Klasen, 1997; UNDP, 2007). Adult unemployment rate stood at 18.4% in the Eastern Cape Province while the youth unemployment rate in the Eastern Cape Province was about 41.4% compared with the national average rates of 35% (Majodina, 2011). Rising food prices have worsened the welfare situation of those who reside in rural and urban poor areas alike, but rural dwellers are further disadvantaged by the absence of alternative opportunities for earning extra income to enable them afford their basic needs at the higher prices.

Government has initiated a number of programmes to deal with this situation, including the payment of social grants which target mostly rural dwellers. Despite these programmes, rural livelihoods are still not improving (Department of Rural Development and Agrarian Reform, 2011). While Government is still committed to improving rural livelihoods and supporting rural dwellers to acquire the necessary skills to participate productively in the economic life of their communities, there is little information regarding the appropriate policies that can improve rural livelihoods (Aliber and Hart, 2009; Zuma, 2011)

It was therefore necessary to carry out this study as a contribution to the identification of reasons for persistent poverty and high rates of unemployment in the Eastern Cape Province. The study was also fundamental in identifying the factors that discourage rural household's participation in agriculture as the main source of income in the Province. The research further made an effort to identify how best these households could be encouraged to participate in agriculture. In that way,

the smallholder farmers could be incorporated into the mainstream agricultural economy, improving the standards of living and enabling them to contribute to the economy.

1.3 Objectives

The broad objective of this study is to assess livelihood strategies and opportunities with regard to farming in Intsika Yethu Local Municipality.

Specific objectives are as follows:-

- To identify the existing livelihood strategies in Intsika Yethu Local Municipality
- To identify the availability of livelihood outcomes in Intsika Yethu local Municipality more specifically, the Qamata Irrigation Scheme
- To assess the impact of farmers socioeconomic factors affecting major livelihoods more specifically, the Qamata Irrigation Scheme

1.4 Research questions

- What are the existing livelihood strategies that are used by households in Intsika Yethu Local Municipality?
- What are the likely livelihood outcomes among the smallholder farmers in Intsika Yethu local Municipality more specifically, the Qamata Irrigation Scheme?
- What are the socioeconomic factors affecting the major livelihood activities at Qamata Irrigation Scheme?

1.5 Hypothesis

The null hypothesis of this study is that socioeconomic factors like age, gender, marital status, education, total household size, employment status, salaries and wages, child grant, and land size do not influence the major livelihood activities at Qamata Irrigation Scheme.

1.6 Organization of the Dissertation

The dissertation is organized into five chapters. Chapter one presented the background to the study, the problem statement and objectives of the study, research questions and hypothesis. Chapter two reviews a literature about livelihood concept and livelihood vulnerabilities, the role of technology adoption by small-scale farmers and a brief overview about the small-scale irrigation technology. Chapter three describes the research methodology applied in the assessment of rural households' livelihoods strategies with regard to farming. It fully describes the study area, data or variables, the sampling method employed, data collection, and research design and data analysis. Chapter four presents and discusses the descriptive results and Chapter six presents the empirical results and Chapter seven is the final chapter and provides the summary, conclusions and recommendations of the thesis.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter reviews the literature about livelihood concepts and livelihood vulnerabilities in the first part. The second part specifically focuses on the role of technology adoption by small-scale farmers and one of the technologies adopted by small-scale farmers that have been identified is irrigation technology. A brief overview about the small-scale irrigation technology will fill a gap in section two of this chapter.

2.2 Livelihood concept

The livelihood concepts has become prominent as a means of understanding the factors that influences people's lives and well-being, particularly those of the poor in the developing world (Bagchi *et al.*, 1998; Bernstein *et al.*, 2001; Davies *et al.*, 2001). In its general sense, a livelihood refers to the means people use to make a living. In the development arena of the early 1990s, the livelihood concept was clarified by some scholars and it is now widely used in studies and policy related to poverty and rural economies and development (Lynam, 2005).

Livelihood has been defined in several ways. For example, Vincent (2001) defines livelihood as the outcomes of how and why people organize to transform the environment to meet their needs through technology, labour, power, knowledge, and social relations. Lipton, as cited by May (1996), defines livelihood quantitatively, as consisting of approximately 200 days per year of work (the means), receiving a reward that is at least sufficient to prevent household poverty (the outcomes). This particular definition directly links livelihood to poverty. The inability of individuals, households or communities to command sufficient resources to construct a livelihood that meets a minimum acceptable standard makes them poor, and therefore they lead a life characterized by deprivation. The definition of livelihood by Chambers & Conway (1992) is but one of the many definitions that are in use. It is one of the early definitions and it is particularly attractive because of its simplicity and openness. Chambers & Conway (1992) define livelihood as “comprising of the capabilities, assets (stores, resources, claims and access) and activities required for a means of living”. This definition has been adopted, sometimes with

minor modifications, by several authors, including Carswell (1997), Carney (1998), Hussein and Nelson (1998), Scoones (1998), Drinkwater & Rusinow (1999), Ellis (2000) and Swift & Hamilton (2001). The livelihood concept as defined by Chambers & Conway (1992) considers livelihood to consist of four parts, namely, i) people and their livelihood capabilities; ii) assets, including both the tangible (resources and stores) and intangible (claims and access), which provide the material and social means that are used to construct livelihoods; iii) activities, i.e. what people do; and iv) a living, which refers to the outcomes of what people do.

2.3 Sustainable Livelihood Framework

The Sustainable Livelihoods Framework (see Figure 2.1) is defined as a tool for understanding how household livelihood system interacts with the outside environment, for both natural environmental and the policy and institutional context (FAO, 2005). The left hand section of the Figure shows the vulnerability context impacts on the livelihood assets of rural people, denoted by the pentagon. Livelihood assets are also influenced by outside policies, institutions and processes. Livelihood strategies of different categories of households are shaped by their asset base and by the policy and institutional context in which they live. Livelihood outcomes of different types of households are influenced by the vulnerability context; this is depicted by people's exposure to unexpected shocks and their ability to withstand the shocks, which depends on their asset base (FAO, 2005). In order to understand the linkages within the framework of Sustainable Livelihoods there are five crucial concepts particularly; the vulnerability context, livelihood assets, institutions, livelihood strategies and livelihood outcomes that have been identified by FAO (2005).

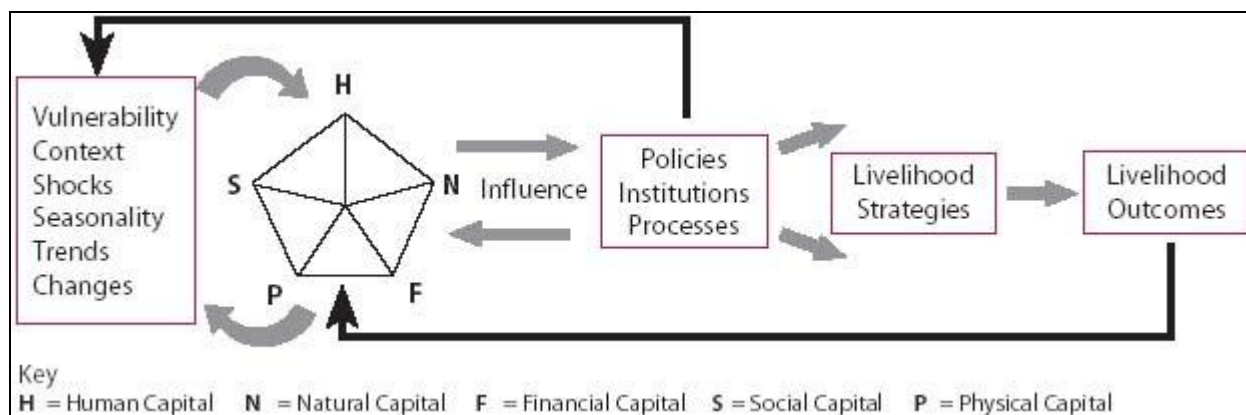


Figure 2.1: Sustainable livelihood framework

Source: FAO (2005)

The vulnerability context refers to unpredictable events that can undermine livelihoods and cause households to fall into poverty. Some of these factors are fast acting (such as earthquakes) and others are slower acting (such as soil erosion), but both can undermine livelihoods (FAO, 2005). It is important to distinguish between shocks originating from outside the community, which affect all people in the same locality, and idiosyncratic shocks that principally affect only individual households (see Table 2.1).

Table 2. 1: Vulnerability context with illustrative examples

| Vulnerability context |
|---|
| Weather-related shocks and natural calamities: drought, earthquakes, hurricanes, tidal waves, floods, heavy snow, early frost, extreme heat or cold waves |
| Pest and disease epidemics: insect attacks, predators and diseases affecting crops, animals and people |
| Economic shocks: drastic changes in the national or local economy and its insertion in the world economy, affecting prices, markets, employment and purchasing power |
| Civil strife: war, armed conflict, failed states, displacement, destruction of lives and property |
| Seasonal stresses: a season where food insecurity and hunger take place. |
| Environmental stresses: land degradation, soil erosion, bush fires, pollution and illness. |
| Idiosyncratic shocks: death in family, job loss or theft of personal property. |
| Structural vulnerability: lack of voice or power to make claims |

Source: FAO (2005)

2.3 Livelihood assets

Livelihood assets refer to the resource base of the community and of various groups of households. A pentagon at the center left side in Figure 2.1 shows different types of assets that rural people might have, such as; human, natural, financial, physical and social. These assets are interlinked.

2.3.1 Human capital

Human capital has been defined as the acquired knowledge and skills through education, training and experience that an individual brings to an activity by Ostrom (1998), FAO (2000), Padilla-Fernandez & Nuthall (2001). A special credit has been given by various studies on agricultural production to human capital for the increased productivity and greater efficiency in the use of agricultural resources in some setting. Farmers with good education, knowledge and experience have are likely to be early adopters of new technologies and more efficiently productive than their accompaniments (CIMMYT, 2000; and Padilla-Fernandez & Nuthall, 2001; Ogundari & Ojoo, 2005; Tjornhom, 2006). This is because such farmers have the ability to read, keep

records, organize and manage, and adopt new market oriented technologies more easily. Through reading they can easily access both general and specific (including technical) agricultural and market information needed for improved management of the farming enterprise. There is also the suggestion that such farmers tend to have stronger drive or exhibit keener entrepreneurship than their colleagues who are not educated. Thus, educated and well-trained farmers have more capabilities for operating, managing and coordinating irrigation facilities more efficiently, which can be translated into improved productivity, food security, employment and poverty reduction in rural communities (FAO, 2000). Such links have been made rather widely albeit indirectly by a large number of studies that have focused on household welfare considerations. These would include the South African studies already cited in this review by Tekana & Oladele (2011), Oni *et al.* (2011), among others, that were apparently more narrowly concerned with household food security and incomes. Those studies have generally included demographic characteristics among the explanatory variables to be employed to explain variations in the dependent or response variable that measures the system performance.

There is need to review social and human dimensions aspect more precisely, by finding information from policies and theories that were relevant to these dimensions.

2.3.2 Natural capital

According to ICID (2007) natural capital refers to the natural-occurring, as opposed to man-made, phenomenon or products. They are goods and services that relate to the natural environment rather than the products of the manufacturing process. For this reason, ICID (2007) identifies in these categories such things as harvesting of food and fibre, utilizing available soils, water supply and occurrence of drought and floods. According to this source, it also includes such things as existing levels of pests and diseases, the climatic conditions and extent of climatic variation, the stock of wildlife, wetlands and biodiversity. Many authors see “land” as an example of natural capital (Prugh *et al.*, 1999; Hawken, 1999). The significance of natural capital rests on the fact that without them production may not take place in the first place. For this reason, the World Bank and other international development agencies now take it into account in their programming for assistance to member countries.

2.3.3 Financial capital

The engagement in labour activities, either off-farm or on-farm, reflects the desire to earn income for consumption. Though some theorists have argued that the poor work in exchange for food, financial gain is the main priority. Financial capital refers to stocks of money to which the household has access. This is likely to be in the form of savings from employment and access to credit in the form of loans. Absence of credit for the rural poor may be due to the lack of collateral, which is required to protect lenders from default in repayment of loans. This is why most African rural farmers do not venture into commercial or agricultural intensification. Availability of land and human labour alone is not enough to fully venture into a farming enterprise, rather, it is financial reserve that ensures the development and creation of physical assets, such as machinery and farming equipment that can be used as production tools. The rearing of livestock has been viewed as a critical form of storing wealth, as a buffer against bad times, in most African countries.

Information from the Second African Regional Conference of the International Commission on Irrigation and Drainage (ICID, 2007) explains financial capital as the form of capital “requiring international, national and local investments, mobilization of savings and credit, urban-rural linkages with accompanying migration of labour, remittances, welfare and pensions, government grants and subsidies” (ICID, 2007). There is a view that it can refer to money that entrepreneurs and businesses use for procurement of raw material and other inputs (Boldizzoni, 2008).

2.3.4 Physical capital

Physical capital assets consist of capital that is created by the economic production processes (Ellis, 2000). Buildings, irrigation canals, roads, tools and machines are examples of physical assets. Physical capital enhances the construction and building of livelihoods. Natural capital on its own is not sufficient to enhance effective livelihood outcomes; it must be complemented by the use of physical capital. Buildings, irrigation canals, roads, ploughs, scotch carts, silos, dairy centers have helped in the primary and secondary stages of the construction of livelihoods.

For agriculture to be successful in rural areas it is not only the availability of land and water that is needed, but the use of machinery, such as tractors, ploughs and irrigation schemes are important. The construction of warehouses or silos has meant that agricultural produce is not exposed to bad environmental conditions and that it is well kept before consumption or

marketing. A good example is construction of tobacco burning furnaces in which freshly harvested leaves are stored and treated at a certain temperature before they go to the market. The availability of such kind of facilities reduces all the good use of arable land when there is adequate rainfall to produce quality tobacco plants since; it allows the product to reach the market. This cements the point of Ellis (2000) who says that, in economic terms, physical capital is defined as a producer good rather than a consumer good. A developed physical capital base enhances the effectiveness and efficiency of sustainable livelihood outcomes.

The construction and development of roads and communication networks facilitates efficient marketing of farm produce and the movement of rural people for other activities, including off-farm activities. Scoones (2000) reports that infrastructural assets such as roads, power lines, and water supplies are very important and facilitate livelihood diversification. Roads facilitate movement of people between places offering different income-earning opportunities and they open up markets that otherwise would not even be there. there are countries that are likely to lack telecommunication facilities and these facilities tend to play an important role in transferring the information between rural centers and remote areas (Swift, 1998).

While it is widely appreciated and accepted that rural economies are based on agriculture, the absence of light and manufacturing industries has been attributed to lack of electricity. The growth in industries would put a cap or limit on migration to urban centers and increase the labour market in the rural areas.

According to Rakodi & Jones (2002) shelter is similarly multifunctional, potentially providing income from rent as well as a location for home based enterprises. The leasing and renting out of accommodation has been a source of livelihood when used to generate income flows for its owners i.e. by utilizing it for cottage industry or renting out rooms (Moser, 1998). The productive capital that enters the asset list of theories by Maxwell & Smith (1992) are included here under physical capital.

There has been a notable change in that physical or man-made capital can substitute for natural capital in many circumstances. The development of technology coupled with industrialization is one way in which physical capital cumulatively substitutes for natural capital over time. Ellis

(2000) argues that this substitution process can potentially help to take the pressure off natural resources that are being depleted in local contexts.

2.3.5 Social capital

Interest in the human dimensions of development naturally calls for a deeper investigation into the social dimensions because both are linked by the fact that socio-economic participation and all the associated transactions are embedded in social relations. The human being does nothing else but transact, be it in the economic or social sphere. According to Granovetter (1985) human actions are embedded in “concrete, ongoing systems of social relations”. The notion of embeddedness was adopted by Williamson (2000) who incorporated it in his four-level social analysis framework where it is assumed to be the source of the informal rules, customs, and norms.

It is on the basis of these that Putnam (1993 & 2000); Bourdieu (1986) & Coleman (1988) introduced and operationalized the notion of social capital, even though they were not the ones that first used the concept in the literature. The notion of social capital goes further back to the work of other scholars who did a considerable amount of work on social exchange theory and contract theory within the psychological discipline (Watson & Papamarcos, 2002). Adam & Roncevic (2003) also contributed in tracing the intellectual history of the concept of social capital which they agree was already part of the work of famous theorists like Tocqueville, John Stuart Mill, Max Weber, John Locke, and others who put some emphasis on group life and community and civic participation. In an Op-Ed published in The Wall Street Journal on 29 September 2007, Bailey (2007) identifies what he called “intangible wealth” which has the same character and features as social capital. The powerful story about the role of trust and networks in making all the difference in productivity between people who otherwise confront the same workplace challenges.

In terms of who first used the term, several authors, including MacGillivray & Walker (2000), Smith & Kulynych (2002), Winter (2000); Woolcock & Narayan (2000) give credit to Hanifan who used the term in 1916 to refer to “goodwill, fellowship, mutual sympathy and social intercourse among a group of individuals and families”. In the opinion of writers like Routledge & Amsberg (2003), the sense in which Hanifan approached the concept of social capital was as a coordinating mechanism in business where, it is assumed to provide the essential social structure

for the people participating at that sphere. A different interpretation was proffered by Woolcock & Nerayan (2000) who saw Hanifan's work as focusing on the value of community participation. The main focus of Hanifan's 1916 work was on school performance but it was clear that a much wider application of the concept was feasible considering that Hanifan recognized the role of what he termed "those physical materials" that are invaluable in human existence, such as goodwill, fellowship and sympathy. There is no question that these issues have application beyond education and can be effectively deployed to advantage in other spheres of life.

Following Hanifan's use of the concept/term, the literature records the emergence of thinking around the networks in a cosmopolitan setting such as an urban area where blood relationships are minimal and people are brought together by other factors. Jacobs (1961) is associated with the application of the concept of social capital to urbanized social relations where it was shown that "networks" are essential in forging close associations among otherwise disparate individuals and groups. A different view seemed to have been championed later in the mid-1970s by Loury whose chapter entitled "A Dynamic Theory of Radical Income Differences" explored these questions a lot more deeply and is frequently cited by other researchers who consider him the creator of the concept. Hofstede (1980) is also given credit for the early conceptualization of the concept although his main writing did not explicitly refer to the concept as it is known today.

Each type of assets is indicated in Figure 2.1 with a capital letter (H, N, F, P, and S) (FAO, 2005). The size and shape of the asset pentagon, that is, the amount and relative importance of each type of capital are not the same in terms of their characteristics between communities and between wealthy and poor households within the same community. For example, for historical reasons, famous communities may control more and better land and natural resources than poor communities, and within any given community, rich households control more land, livestock and physical and financial capital than poor households (FAO, 2005). Community and household assets are influenced by two sets of outside factors: first, the policy and institutional context and secondly the vulnerability context (FAO, 2005).

Table 2. 2: Types of livelihood assets with illustrative examples

| Types of livelihood assets |
|--|
| Human capital: household members, active labour, education, knowledge and skills |
| Physical capital: livestock, equipment, vehicles, houses, irrigation pumps, |
| Natural capital: access to land, forests, water, grazing, fishing, wild products and biodiversity |
| Financial capital: savings/debt, gold/jewellery, income, credit, insurance |
| Social capital: kin networks, group membership, socio-political voice and influence |

Source: FAO (2005)

2.4 Policies and Institutions

Policies and institutions are an important set of man-made external factors that influence the range of livelihood options open to different categories of people. They also influence access to assets and vulnerability to shocks (FAO, 2005). An enabling policy and institutional environment makes it easier for people, poor and less poor, to gain access to assets they need for their livelihoods. A disabling policy and institutional environment may discriminate against the poor, thus making it difficult for them to get access to land, livestock, capital and information. Asset ownership influences the range of livelihood options open to different categories of people. Households with plenty of assets such as land, water, livestock, equipment and money, as well as higher education and skills and better socio-political networks, generally have a wider range of livelihood options than households with fewer assets. There is double causality between the vulnerability context and asset ownership. On the one hand, shocks cause people to lose their assets. On the other hand, assets help protect people's livelihoods against shocks. Human capital is less vulnerable to shocks because it cannot be stolen, lost or taken away easily (unless you die or you go crazy, get too sick to use it and get too old to work).

Institutions function to coordinate expectations by providing assurance regarding one's own actions and those of other people (Schotter, 1981; Hardin, 1982). Problems therefore, arise when institutions do not function as they should. The institutional arrangements in Strydkraal Irrigation Scheme such as centre pivot committees in which all chairpersons for an umbrella body for the governance of an irrigation scheme is essential for its success. This is the case for Strydkraal Irrigation Scheme in Limpopo Province. Local leadership such as the Chief's involvement is also

vital for successful partnerships of irrigation schemes (Tenywa, Rao, Turkahirwa, Buruchara, Adenkunle, & Mugabe, 2011).

The greatest need in rural areas seems to be the strengthening and development of rural communities and institutions into self-contained sustainable entities of society (FAO, 1997). Rural communities, even in the modern setting, still operate on principles of customary law or belief system and tradition still provides guidelines to legal and administrative processes outside government. These processes determine on one hand, the property rights regime including land tenure (FAO, 1997). An understanding of African traditional land tenure systems and the management of common property are essential elements in designing successful smallholder irrigation systems (FAO, 1997).

The majority of Africans however, hold their land under indigenous customary land tenure systems irrespective of the formal legal position under national law (Bruce *et al.*, 1993). This applies to most irrigated land under smallholder cultivation. The fact that traditional land is still viewed as state land has allowed political interference in its management, administration and legal interpretation of rights over the land and the water that flows on that land. It can be argued, therefore, that land tenure reforms which give traditional land users both communal and individual *de jure* ownership rights, are essential in creating effective and democratic rural and irrigating communities.

The range of tenure systems on South African smallholder irrigation schemes occur in various forms of trust tenure, traditional tenure, leasehold, quitrent and freehold (Lahiff, 1999; Mosaka & Mullins, 2006; Van Averbeke & Maake, 2010). Generally, Trust, quitrent and freehold are tenure systems that are mostly limited to the Cape and KwaZulu-Natal. Zanyokwe in Keiskamahoek, Eastern Cape, is one of few irrigation schemes where both of these tenure systems occur (Manona *et al.*, 2010 citing Van Averbeke *et al.*, 1998). Farmers on quitrent (pay rent to magistrate) and right to occupy (communal under traditional leadership) land tenure arrangements for example, have no sense of ownership and hardly invest in new technologies that will help improve water use efficiency.

Two “new” forms of tenure, which are variations of old-order forms, are proposed to help overcome some of these land tenure problems (Manona *et al.*, 2010). These are perpetual statutory rights and perpetual conditional state lease system, underpinned by a local land administration system. The first new form of tenure will in effect provide for the transition from a permit based system to a ‘rights-based tenure system. The effectiveness of the proposal depends on two concurrent elements: the explicit definition of rights; and the establishment of efficient local procedures to support secure, transparent and inexpensive transactions. The second new form of tenure is to reform the quitrent system to a “perpetual conditional state lease” right. This would be largely administered through the existing registry but strengthening the system through a local administration offices (Manona *et al.*, 2010). Legal ownership of land would be retained by the State, but each rights holder (or group) would be issued with certificate held in perpetuity, linked to the land register and conditions (agricultural use, compliance with administration system etc.).

Most smallholder irrigation systems are controlled and managed by state organs. Some governments have attempted to replace customary tenure with state guaranteed individual rights (registered titles). The general experience, however, has been that state imposed individualized tenurial systems do not necessarily offer greater security for African land users, because of weaknesses of government institutions in Africa.

Water rights under traditional customary law are common property, managed for the greater good of the community. Most state laws, however, assign water rights to commercial (title deed) land, while the state enjoys water rights over traditional land. Smallholder irrigation, therefore, generally enjoys water rights via a third party, usually a state bureaucrat holding such rights in trust for the community. This situation exacerbates the already insecure land tenure situation and smallholder irrigators' rights are often susceptible to state and political interference. This needs to be addressed to ensure access to irrigation water by small-scale irrigators.

Table 2. 3: Institutions with illustrative examples

| Institutions |
|---|
| <ul style="list-style-type: none"> • Institutions include both membership organizations and invisible "rules of the game" • Formal membership organizations such as cooperatives and registered groups • Informal organizations such as exchange labour groups or rotating savings groups • Political institutions such as parliament, law and order or political parties • Economic institutions such as markets, private companies, banks, land rights or the tax system • Social-cultural institutions such as kinship, marriage, inheritance, religion or draught oxen sharing |

Source: FAO (2005)

Table 2. 4: Vulnerability and resilience

| Vulnerability and Resilience |
|---|
| <p>Households with many livelihood assets are generally more able to preserve their lives and property in the face of shocks than households with fewer assets. They have enough savings that they can afford to buy food when crops fail. They have enough animals that they can afford to lose or sell a few and still have enough breeding animals to build up their herds again after the emergency passes. Resilience is the ability to withstand shocks.</p> <p>Households with few assets (i.e., little land, few animals, limited physical and financial capital, weak family labour, poor education and lacking in marketable skills) are much more vulnerable to outside shocks than households with more assets. In the face of prolonged drought, when crops fail, poor households are forced first to sell off their animals at low prices to buy grain to feed their families. The longer the emergency, the more they deplete their asset base, to the point that they no longer have anything left to sell but their labour, and even their labour is weak due to hunger and failing health. When they lose their assets, they lose their means of livelihood.</p> |

Source: FAO (2005)

2.5 Livelihood system

Livelihood system is the total combination of activities undertaken by a typical household to ensure a living. Most rural households have several income earners, who pursue a combination of crop and livestock, farm, off-farm and non-farm activities in different seasons to earn a living. Income brought by different household members may be pooled in a common "pot" or "purse" or income earners may hold part of it back for personal spending money. In addition to productive tasks, there are reproductive tasks that need to be performed on a daily or seasonal basis such as fetching water, fuel, cooking, cleaning and looking after children. Finally, participation in community-level socio-cultural and political activities is part of the livelihood system. The livelihood system also includes the total pattern of labour allocation of household members between crops, livestock, off-farm work, non-farm business and reproductive and community tasks.

Local institutions influence household livelihood strategies directly, by determining which activities are legal/illegal and appropriate/inappropriate for women and men, by creating incentives to pursue certain activities and choices over others, and by influencing perceptions of the effectiveness of particular strategies for achieving desired outcomes. Local institutions also affect household livelihood strategies indirectly through their influence on access and control of household assets.

2.6 Livelihood outcomes

Livelihood outcome are what household members achieve through their livelihood strategies, such as levels of food security, income security, health, well-being, asset accumulation and high status in the community. Unsuccessful outcomes include food and income insecurity, high vulnerability to shocks, loss of assets and impoverishment (FAO, 2005).

Table 2. 5: - Key linkages in the Sustainable Livelihoods Framework

| The key linkages in the Sustainable Livelihoods Framework | |
|---|--|
| <ul style="list-style-type: none"> • The vulnerability context influences household livelihood assets • Policies and institutions also influence household livelihood assets • Policies and institutions can increase or decrease individual vulnerability • Household asset ownership widens livelihood options • Asset ownership decreases vulnerability and increases ability to withstand shocks • The range of livelihood options influences livelihood strategies • Different livelihood strategies lead to different livelihood outcomes (positive and negative) • Livelihood outcomes influence the ability to preserve and accumulate household assets | |

Source: FAO (2005)

The process of falling into or getting out of poverty is illustrated in the modified Sustainable Livelihoods Framework Figure 2.2

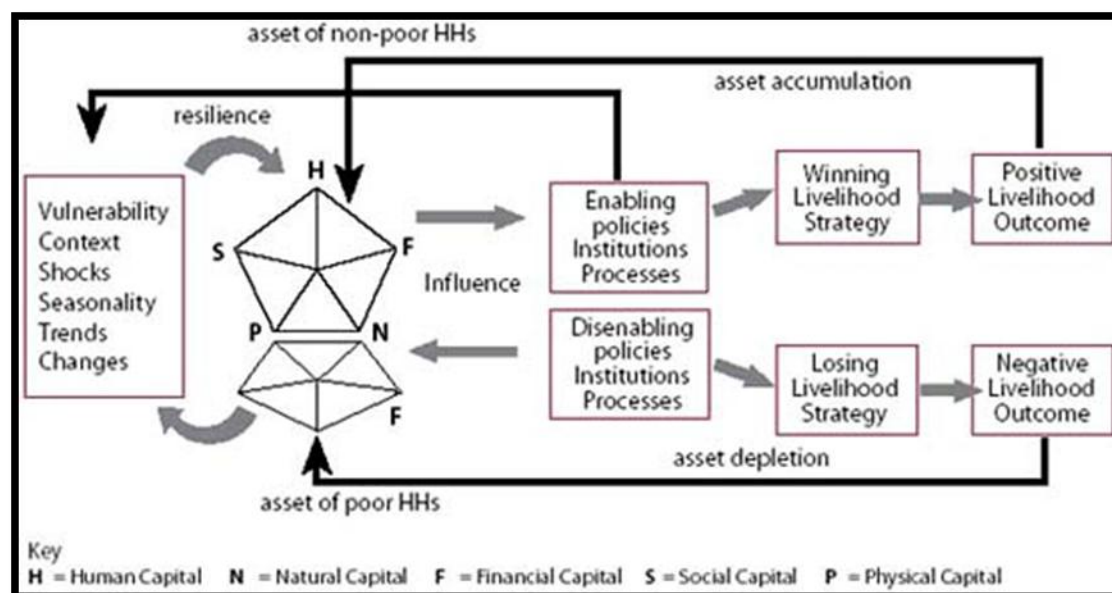


Figure 2. 2: Modified Sustainable livelihood Framework; Source: FAO (2005)

2.7 Livelihoods and poverty

The asset base of poor households is much more limited than that of non-poor households because of disabling policies, institutions and processes. Restricted access to land, water, natural resources and other assets limits poor households' livelihood options. Lack of assets to fall back on in an emergency makes them vulnerable to shocks. Shocks contribute to negative livelihood outcomes and further depletion of household assets, leading to of deepening poverty.

Enabling policies, institutions and processes, non-poor households enjoy a broader livelihood asset base, which widens their livelihood options and reduces their vulnerability to shocks. This enables the non-poor to pursue winning livelihood strategies and to achieve positive livelihood options.

To enable poor households to overcome their poverty, development projects can take three broad lines of action: (i) they can help poor households to build up their assets - especially their human and social capital; (ii) they can transform the policy and institutional context from one that disables the poor to one that is more pro-poor, or (iii) they can reduce vulnerability, by strengthening resilience at community and household level, in parallel with support for disaster prevention and risk management at higher institutional levels.

2.8 Local institutions, poverty reduction and the Millennium Development Goals

Local institutions that are elite-dominated, unegalitarian, undemocratic, un-transparent and unaccountable to local community members are disabling to the poor and reduce their chances of getting out of the poverty trap. Such a disabling institutional context can undermine the effectiveness of poverty reduction efforts and slow progress on achieving the Millennium Development Goals. The Millennium Development Goals include: Eradicating extreme poverty and hunger, Achieving universal primary education, Promoting gender equality and empowering women, Reducing child mortality rates, Improving maternal health, Combating HIV/AIDS, malaria, and other diseases, Ensuring environmental sustainability, and Developing a global partnership for development. Conversely, poverty reduction efforts tend to stand a greater chance of success when they are implemented in an enabling institutional context (i.e., where

local institutions are egalitarian, autonomous, self-reliant, democratic and accountable to local citizens).

2.9 Livelihood Typology

A livelihood is a combination of the resources used and the activities undertaken in order to live. It consists of resources such as human capital (individual skill and abilities), natural capital (land and water), financial capital (savings), physical capital (equipment) and social capital (relationships). Rural households engage in farming, labour, and migration, but one of these activities usually dominates as a source of income. Five livelihood strategies can be distinguished. Some farm households derive most of their income from actively engaging in agricultural markets (market-oriented smallholders). Others primarily depend on farming for their livelihoods, but use the majority of their produce for home consumption (subsistence-oriented farmers). Still others derive the larger part of their income from wage work in agriculture or the rural nonfarm economy, or from nonagricultural self-employment (labour-oriented households might choose to leave the rural sector entirely, or depend on transfers from members who have migrated (migration-oriented households). Finally, diversified households combine income from farming, off-farm labour, and migration.

Income sources can be used to classify rural households according to the five livelihood strategies (see Table 2.6 and Table 2.7). The relative importance of each differs across the three country types: agriculture-based, transforming, and urbanized. It also differs across regions within countries. Farming-led strategies are particularly important in the agriculture-based countries, where farming is the main livelihood for a large share of rural households, as many as 71 percent in Nigeria and 54 percent in Ghana and Madagascar. Many of those households are subsistence oriented. In the transforming and urbanized countries, the labour- and migration-oriented strategies are more common, with shares of labour-oriented households varying from 18 percent in Vietnam to 53 percent in Ecuador. On the other hand, countries with substantial rural populations are called as non-urbanized countries. These are countries with the majority of their populations living in the rural areas.

Globally, an estimated 86 percent of rural people rely on agriculture as their source of livelihood (World Bank, 2002). According OECD (2006) agricultural sector productivity has made a substantial contribution to economic growth and poverty reduction. Agriculture in rural areas has

been identified to possess the capacity to reduce poverty by involving the productive capacity of the poor's assets of land and labour, and by reducing and stabilizing food prices and creating opportunities of employment as well as rural economic growth.

OECD (2006) also denoted agriculture as an activity that involves rural households in farming, herding, livestock production, fishing and aquaculture. An important point to note is that agriculture can be practiced for either subsistence or commercial purposes and for the poor people with limited resources practicing agriculture is mainly for subsistence or consumption purposes. Saith (1992) portrays agriculture as the primary strategy that has been the dominant livelihood strategy to rural development in the last three decades of the twentieth century. This was because it has supported rural households indirectly or directly and also small poor farmers could simultaneously achieve growth, poverty reduction and a living.

Ellis (2000) argues that direct support for the rural households included subsidies for fertilizer, irrigation and funding of international and national agricultural research. Indirect support has included funding of rural infrastructure such as rural feeder roads, the creation of state parastatal agencies to provide services to agriculture, and integrated rural development programmes comprising components within supposedly unified frameworks (Ellis, 2000).

Poor people in rural areas rely heavily on their environment for most of their needs and are affected by the deterioration in the quality and quantity of these resources. The availability of natural and physical capital such as land, water, air, biological resources, livestock, irrigation canals, buildings and environmental services, etc. have made it possible for agriculture to be practiced as a livelihood strategy in the rural areas. Marcus *et al* (1996) debated that many rural households in communal areas regard themselves as agriculturalists and those who does not have land aspire to acquire land within these areas while those with land are eager for more; this indicates the value of land based strategies to livelihoods. The production of crops and livestock is a social protection mechanism for these people as they gain a livelihood, and gain income through sales.

Table 2. 6: Typology of rural households by livelihood strategies in three country types

| | | | Farm oriented | | | | | | |
|--|------------|------|-----------------|----------------------|-------|-----------------|--------------------|-------------|-------|
| | | | Market oriented | Subsistence oriented | Total | Labour oriented | Migration oriented | Diversified | Total |
| (Percentage of rural households in each group) | | | | | | | | | |
| | Country | Year | | | | | | | |
| Agriculture-based countries | Nigeria | 2004 | 11 | 60 | 71 | 14 | 1 | 14 | 100 |
| | Madagascar | 2001 | - | - | 54 | 18 | 2 | 26 | 100 |
| | Ghana | 1998 | 13 | 41 | 54 | 24 | 3 | 19 | 100 |
| | Malawi | 2004 | 20 | 14 | 34 | 24 | 3 | 39 | 100 |
| | Nepal | 1996 | 17 | 8 | 25 | 29 | 4 | 42 | 100 |
| | Nicaragua | 2001 | 18 | 4 | 21 | 45 | 0 | 33 | 100 |
| Transforming countries | Vietnam | 1998 | 38 | 4 | 41 | 18 | 1 | 39 | 100 |
| | Pakistan | 2001 | 29 | 2 | 31 | 34 | 8 | 28 | 100 |
| | Albania | 2005 | 9 | 10 | 19 | 15 | 10 | 56 | 100 |
| | Indonesia | 2000 | - | - | 16 | 37 | 12 | 36 | 100 |
| | Guatemala | 2000 | 4 | 7 | 11 | 47 | 3 | 39 | 100 |
| | Bangladesh | 2000 | 4 | 2 | 6 | 40 | 6 | 48 | 100 |
| | Panama | 2003 | 1 | 5 | 6 | 50 | 6 | 37 | 100 |
| Urbanized countries | Ecuador | 1998 | 14 | 11 | 25 | 53 | 2 | 19 | 100 |
| | Bulgaria | 2001 | 4 | 1 | 5 | 12 | 37 | 46 | 100 |

Source: Davis *et al.*, 2007.

Among these households, wages from nonagricultural labor often contribute a larger share of average labour income (as in Indonesia, Pakistan, and Panama), while nonagricultural self-employment earnings are more important in labour-oriented households in Ghana and Vietnam. In Bulgaria, Ecuador, and Nepal, agricultural wages are important for the income of labour-oriented households. Despite the importance of the labour pathway in transforming countries, market-oriented farming households remain the largest rural group in Vietnam. Even if most households are specialized, that is, they derive the vast majority of their income from only one of the three income sources (farming, labor, or migration); a substantial remaining share of households in all countries has diversified income strategies. In the 15 countries of Table 2.6, 14 to 56 percent of households do not derive more than 75 percent of their income from one of these mixed income portfolio. These diversified households derived between 20 percent (in Bangladesh) and 46 percent (in Ghana, Malawi, and Vietnam) of their income from farming.

Table 2. 7: Constructing comparable measures of income across countries

The analysis of sources of rural income presented here is based on income aggregates from the Rural Income Generating Activity database. For each country the income components includes wages (separately for agriculture and nonagricultural), self-employment, crops, livestock, transfers, and a final category of all remaining non-labor income sources (excluding imputed rent), as reported in each country questionnaire. All aggregates are estimated in local currency at the household level and annualized and weighted. Some of the country results may differ from results previously published in poverty assessments and other country reports because of efforts to ensure comparability across countries in the results presented here. Analyses that draw on income aggregates from different sources using different methodologies would make it impossible to compare results between different countries. While the standardized calculations across countries enhance comparability, the analysis of sources of rural income is constrained by the pervasive weakness of the raw income data in many of the surveys analyzed. Many household surveys likely underestimate income because of underreporting, misreporting of the value of own consumption, income seasonality, and the difficulty of obtaining reliable income data from households that do not usually quantify their income sources.

Source: (Davis *et al.*, 2007) and www.fao.org/es/esa/riga/

2.10 Livelihoods Vulnerabilities

The assets which poor people possess or have access to, the livelihoods they desire and the strategies they adopt are influenced by the context within which they live. Various scholars have come up with different definitions of vulnerability. According to Rakodi & Jones (2002) vulnerability refers to insecurity of well-being of individuals, households or communities in the face of a changing environment. Environmental changes that threaten welfare may be ecological, economic, social or political. Risk and uncertainty and declining self respect tend to accompany environmental changes (Moser, 1996). High degree of susceptibility and exposure are the key features of poverty and this includes risk of crises, stress and shocks and little capacity to recover quickly from them. Carney (1998) says that to understand vulnerability it is necessary to analyse trends (resource stocks, demographic change, available technologies, political representation and

economic trends), shocks (the climatic and actual or potential conflicts) and culture (as an explanatory factor in understanding how people manage their assets and the livelihood choices they make). It is also possible to distinguish between

- Long term trends, such as demographic trends or changes in the natural resource base
- Recurring seasonal changes, such as prices or employment opportunities and
- Short term shocks, such as illness, natural disaster or conflict.

DFID (2000) also presents a slightly different dimension of vulnerability by including seasonal trends and shocks that affect people's livelihoods. The key attribute of the definition is the fact that these factors are susceptible to control by local people themselves, at least in the short and medium term. Livelihood insecurity is a constant reality for many poor people and insecurity is a core dimension of most forms of poverty.

According to UNDP (2012) many parts of sub-Saharan Africa rural livelihoods are still under substantial stress. Dorward & Poulton (2008) argues that much has been done on the literature to address the subject of livelihoods, livelihood sources, livelihood strategies and outcomes. In order to begin reviewing these aspects one has to look at the trends in extreme poverty both worldwide and locally, as well as in South Africa. According to data generated for the United Nation's Millennium Development Goals (MDG) Report 2008 (United Nations, 2008), as much as 26% of the world's population was in extreme poverty in 2005. More recent world development indicators released by the World Bank (2012) suggest that the situation has improved somewhat, when measured in purchasing parity (PPP) terms, with the proportion of people living on less than \$1.25 a day falling to 22.2%. But this seemingly positive development hides disturbing regional trends that leave sub-Saharan Africa at a serious disadvantage. For instance, rapid improvements have occurred in East Asia, and the situation in South Asia has not changed much, while in sub-Saharan Africa, the situation has actually worsened, with as many as 51% of employed people in sub-Saharan Africa living in extreme poverty (World Bank, 2012). Along with this, hunger has increased, especially in the rural areas of sub-Saharan Africa, with as much as one in seven persons being hungry (World Hunger Education Service, 2012).

In an attempt to explain the foregoing situation with respect to sub-Saharan Africa, many commentators and researchers have considered a myriad of factors, including the productive capacity of the agricultural sector which remains the major employer in much of the continent (Spencer *et al.* 2003; Nweke *et al.* 2002; The World Bank 2011 and 2012, among others). As far back as 1981, the United States Department of Agriculture (USDA) observed that Africa was the only part of the world that experienced declining per capita food output in the two decades preceding its report (USDA, 1981). In reviewing research priorities for sub-Saharan Africa to promote agricultural development to reverse the “lagging food production and widespread poverty” in the region, Eicher (1982) expressed the hope that the continent would receive more international support than in the past to address the identified gaps. However, whereas a good deal of attention was devoted to the continent in the ensuing decades and aid expanded astronomically, the scale of the problem may have been overwhelming or other factors were at play. There is no denying that widespread famine at the scale feared in the 1980s (Eicher, 1982) did not occur, leaving the real possibility that significant breakthroughs in development would be realized. Such optimism was propelled by, among other things, the consensus of the international community around the Millennium Development Goals (MDGs) (Easterly, 2008). But the momentum quickly dissipated. In an address to the 34th Session of the Governing Council of the International Fund for Agricultural Development (IFAD), the former Secretary General of the United Nations, Mr. Kofi Annan observed that, as a proportion of the aid package from the international community support to African agriculture fell from 18% to about 3% between the 1970s and 2011 (IFAD, 2011). It is therefore not surprising that little visible improvement occurred in the conditions at the human level as macroeconomic performance deteriorated even further and as many as 240 million people experienced increased deprivation and destitution in respect to virtually all measures of welfare (IFAD, 2011). The characterization of sub-Saharan Africa as a “continent in crisis” is clearly borne out of these realities (Nweke *et al.*, 2002).

The situation for southern Africa and South Africa need to be examined further. According to the Southern African Development Community (SADC), vulnerability to hunger is still high even though a few countries have been experiencing increases in cereal production (SADC, 2011). The indication is that, at the regional level, there are now more people requiring food and non-food assistance than previously, with the number estimated to have increased from 3.3 million persons to about 4.04 million persons in 2011 (SADC, 2011). At some point in the early years of

the present 1990, the ratio of the population suffering from extreme poverty in the region was estimated at about 70%, which may actually be understated as overstated for many countries in the region. For instance, rural conditions have been worsening in many countries of the region since 2001/2002 when the region as a whole experienced the worst food and humanitarian crises in years (United Nations Development Programme, 2003).

While many of the affected countries have since begun to recover, this has not been the case for others, leading to the conclusion that there may be other factors to consider. South Africa continues to be an enigma in many respects. Without doubt the most sophisticated economy on the continent as it is described by Eberstadt (2011), South Africa presents many contradictions that continue to pose policy nightmare. Despite a well-performing macro economy, the country has now gained the unenviable reputation of being the most unequal society in the world. With democratic rule in South Africa, policies were introduced to redress the extreme inequalities in income, wealth and livelihoods engendered by apartheid rule. There was the expectation that enhanced access to productive resources such as land and technical support would translate into increased agricultural productivity for the black farmers who make up the bulk of the smallholders in the country (Obi & Pote, 2011).

Earlier research as the reform measures got underway, notably Makhura & Mokoena (2003), were of the opinion that the country's poorer sections would experience increased incomes, which would contribute to poverty reduction. But recent studies suggest that this goal has not been realized and that there has rather been a growing pauperization of the citizens, especially the black population, manifested in deteriorating unemployment rates and poverty levels (Klasen, 1997; Klasen & Woolard, 2005, UNDP, 2003 and 2007). Some of the indicators that have pointed to the deteriorating situation include the unemployment rates, the poverty rates, the Gini Coefficient, and Consumption Expenditure Growth. For instance, while the broadly defined unemployment rates in the country stood at about 31% in 1993 (on the eve of the inception of majority rule in 1994), they had deteriorated to about 38% by 1997, rising again to about 39% in 2005. Whereas, nationally, the government had hoped to lower unemployment to about 14%, it still hovered around 25-40% in 2011 (Eberstadt, 2011).

The provincial data are equally disturbing, according to studies conducted in the late 1990s and early 2000's, which suggested that provincial unemployment rates in the Eastern Cape might

have been in the order of 30-70% (Department of Labour, 2003). Poverty has been shown by many studies to be closely related to unemployment, among other factors (Klasen, 1997). It is therefore not surprising that the Eastern Cape Province which has the highest unemployment rate in South Africa also has the highest poverty rates. Data going back to the mid-1990s make this point strong, showing figures as high as 71% in 1998. Data generated by the Department of Labour (2003) and the Development Bank of Southern Africa (2005), suggest that the situation could be worsening. According to available data, this high poverty rate in the country is accompanied by the highest levels of income inequality in the world (HSRC, 1996; Klasen, 1997; Lam 1999; UNDP, 2007). According to the UNDP (2007), the Gini coefficient estimated for South Africa for 2006 stood at about 0.59.

The South African Presidency's Development Indicators Report published in 2009 showed that the Gini Coefficient has risen to between 0.66 and 0.68, depending on whether it is computed on the basis of the All Media and Products Survey (AMPS) or the Income and Expenditures Survey (IES) of the Statistics South Africa (The Presidency, 2009). By 2012, this index had further risen to 0.69 (Westaway, 2012). These results are consistent with the fact that, among the Medium Human Development countries to which South Africa is placed by the UNDP, it is one of the few whose Human Development Indices actually deteriorated since the early 1990s, having fallen from 0.735 in 1990 to 0.653 in 2004 (UNDP, 2006). In 2011, this index has fallen to 0.619 (UNDP, 2011), again highlighting the worsening welfare performance.

Other measures of economic welfare have equally portrayed a dismal picture. For instance, analyses based on comparable consumption aggregates from the Income and Expenditure Surveys of South Africa (IES) have also been presented by government reports and suggest that over the 5-6 year-period between 1994 and 2000, consumption growth slowed to less than 1% per capita per annum (Department of Land Affairs/Department of Agriculture, 2005). This index is now being reported by the newly-created National Planning Commission which was established in the Presidency under the Zuma Administration. More recent figures reported in the Development Indicators show some improvement in the numbers which have averaged about 3.7% since 2003 (The Presidency, 2010). Despite this improvement, there is still evidence of growing poverty in the country. According to the Development Indicators 2010, while 70% of the GDP is earned by the richest 20% of the population, the poorest 10% of the population earns

only 0.6% of the GDP (The Presidency, 2010). This picture is in line with the trend in the Poverty Headcount Index which suggests that up to 48% of the population might still be living below a poverty line set at R524 per month to accommodate the increased uptake of social grants in the rural areas (The Presidency, 2010).

This situation shows that nothing much has changed since 2004 when, in presenting the Budget for that year, the South African Finance Minister at the time, Mr. Trevor Manuel, bemoaned the emergence of a "...second economy characterized by poverty, inadequate shelter, uncertain incomes and the despair of joblessness..."(Obi *et al.*, 2005). According to the Minister, many South Africans were "trapped" in that "second economy" (Obi *et al.*, 2005). The National Plan released in 2011 by a Commission now chaired by Mr. Trevor Manuel in his new role as Minister in the Presidency, observes that, "for many poor South Africans, there is still much that looks the same..." as South Africa in the pre-1994 era (National Planning Commission, 2011). As the reform measures gathered momentum, about 10 years post-liberation, a vicious circle of poverty was clearly evident, being fuelled by the extreme disparities that put the greater proportion of national wealth in the hands of a small minority (Pauw, 2005).

In 2011, the Department of Agriculture, Forestry and Fisheries (DAFF), conducted a review of studies and methodologies used for the estimation of agricultural productivities in South Africa in order to improve the quantitative basis for its policy formulation for the agricultural sector (Ramaila *et al.*, 2011). As might be expected, the former "independent homeland" areas, namely Transkei, Ciskei, Venda, and Bophuthatswana, which were granted "independence" by the apartheid regime (Berry, 1996; Raeside, 2004), have exhibited these problems much more than any other part of the country. According to Van Zyl, Kirsten & Binswanger (1996), these former "homelands" were characterized by inadequate market access, poor and deteriorating infrastructure and support services for smallholder farmers.

Westaway (2012) has provided an interesting recent sketch of the philosophical and strategic considerations that informed the creation of these "homelands" or "reservations", and probably explain the sharp differences in conditions between them and what used to be "South Africa". In some way, it would seem that the fact that these former "homelands" consistently represent some exceptional spaces where attitudes and circumstances have such mythical similarities is actually not random but has resulted from careful planning by the National Party that created Apartheid

about how the economy was to be managed to guarantee the supply of its productive resources and channel these to the achievement of scientific and technical progress (Westaway, 2012).

2.11 Livelihood Strategies

Compared to urban areas, rural areas are likely to have high levels of poverty. People in rural areas have been considered to be the poorest inhabitants who rely on access to mutual group of resources (Ellis, 2000). Livelihood strategies are "the range and combination of activities and choices that people make in order to achieve their livelihood goals." On the basis of their personal goals, their resource base and their understanding of the options available, different categories of households - poor and non-poor - develop and pursue different livelihood strategies. These strategies include short term considerations such as ways of earning a living, coping with shocks and managing risk, as well as longer-term aspirations for children's future and old age (FAO, 2005).

Livelihood strategies are composed of the various activities undertaken by the household to generate a living. They are the patterns of behavior adopted by the household as a result of the mediation processes on the household assets. As an intrinsic part the assets-activities-outcomes cycle, livelihoods strategies are generally adaptive over time, responding to both opportunities and changing constraints. Livelihood strategies have been classified according to different criteria. Scoones (2008) & Swift (1998) divide rural livelihood strategies into three broad types according to the nature of activities undertaken: agricultural intensification and extensification, livelihood diversification, and migration (see Table 2.8)

The sustainable livelihoods framework in Figure 2.1, has been adopted by many researchers and development organizations as an alternative methodological approach to the alleviation and reduction of poverty. It aims to reduce vulnerability by helping people to build on their own support and resources (Bryceson, 2004). According to UNSRSD (2008) it has been understood that the predictable definitions and approaches to poverty eradication focused too narrowly on certain aspects of poverty, such as low income, and did not consider the vulnerability and social segregation aspects. For rural areas it may be debated that insufficient consideration has been given to the complexity of rural livelihoods and the multiple dimensions of rural poverty (Carney, 1998). Rural households participate in different activities to ensure that they make a living and according to the World Bank (2002) the analysis of how rural individuals or

households control in making a living dismisses frequent misconceptions about rural populations. It is often believed that rural households are either all farmers or all diversified. Instead, there is a considerable heterogeneity in what they do and in the relative importance of what they do for their livings. A majority of rural households participate in some agricultural activities but may derive a large part of their income from off farm activities and from migration. These have been termed livelihood strategies and the concept has become central to development practice in recent years. A crucial goal of livelihood strategies is to ensure household economic and social security.

Table 2. 8: Agricultural intensification or extensification, livelihood diversification, and migration

| Agricultural intensification/extensification | Livelihood diversification | Migration |
|--|--|---|
| <p>These strategies mainline continued or increasing dependence on agriculture, either by intensifying resource use through the application of greater quantities of labour or capital for a given land area, or by bringing more land into cultivation or the implications for labour and capital.</p> <p>Technical developments in agriculture may also operate as a key determinant. The availability or not of this option, and the extent to which it is undertaken by the household, will determine in major part the need for, and the household resource available to off-farm livelihood diversification.</p> | <p>Diversification here may be to broaden the range of on-farm activities (e.g. adding value to primary products by processing or semi-processing), or to diversity off-farm activities by taking up new jobs. It may be undertaken by choice for accumulation or reinvestment purposes, or of necessity either to cope with temporary adversity or as a more permanent adaptation to the failure of other livelihood options. The former motivation might be associated with a wide income-earning portfolio to offset all future types of shocks or stress, whereas the latter would more likely be a narrower, rehearsed response to a particular type of common shock or stress.</p> | <p>Migration may be voluntary or involuntary. As a strategy to secure off-farm employment (i.e. needs driven), it may rely on and/or stimulate economic and social links between areas of origin and destination. Kinship structures, social and cultural norms may strongly influence who migrates. Migration will have implications for the asset status of those left behind, for the role of women and for on-farm investments in productivity.</p> |

Source: Scoones & Swift, 1998

However, Ellis (2000) is against these typologies on the grounds that the options and possibilities they (necessarily) exclude can be more important than those they include, and that the process of classifying behaviours restricts attention and analysis to the conventional practices. According to FAO (2006) livelihood strategies differ significantly within a country, from rural to urban areas, and across countries. Also this was identified that the household is taken as the unit of reference since it is the primary level of aggregation through which people organize production, share income and consumption.

The major purpose of understanding livelihood strategies is to awaken one's mind on how and when individuals, households and groups settle among themselves, and with other communities, markets and societies. The most basic livelihood outcomes relate to satisfaction of basic human needs, such as food, water, shelter, clothing, sanitation, health care, and others. The final outcome is to achieve the maintenance of the household and to corrupt the next generation with a desirable quality of life. People tend to develop the most appropriate livelihood strategies possible to reach desired outcomes such as food security, good health; "well-being" etc. Insecure or poor livelihood outcomes may be the results of several factors which often interact, including low levels of livelihood assets, high degree of vulnerability to external shocks, and insufficient livelihood support from surrounding institutions (e.g. local government, financial markets) (FAO, 2009).

According to Monde *et al.* (2006), rural areas of South Africa are marred by problems of poverty and food insecurity. Rural areas are thought of as places where a surplus of food is for urban centers. However, in the communal areas of South Africa, that is no longer the case. This means that rural households used to produce more food and the surplus (excess) transferred to urban areas (urban markets), but now things have changed because rural households are the ones now that get food from urban areas (markets) by purchasing them. A research that was done between the two rural villages (Guquka and Koloni) in the Eastern Cape Province has identified the list of different food acquisition strategies adopted by people (Monde, 2003). People in these two rural areas acquired food in five different ways, namely by purchasing food from urban markets, purchasing food from village markets, the household's own production of crops and livestock, bartering of food (exchange food for food) and claiming against relations.

According to Lahiff (2002), the landlessness, vulnerability and unemployment lack of basic services and, above all, poverty, remain central to the lives of the majority of the population. High rates of poverty are associated with the lack of employment opportunities. The majority of adults are unemployed or underemployed, and most rural households get their income either by cheap, unskilled labour, or survivalist self-employment, or government grants (Steinberg, 2008). In South Africa, people can obtain income from various sources. These include income from wages, salaries and commissions; income from own businesses; income from sales of farm produce and services, income from rents and interest; and finally income from remittances, pensions and grants (Zerihun, 2011).

2.12 How rural people accumulate livelihood strategies

Subsistence agriculture is declining in rural areas (Baiphethi & Jacobs, 2009). Today, many rural households are engaged in non-farming activities, which are the most livelihood strategies than farming (Monde, 2003). If rural households are unable to grow crops, keep livestock or purchase enough food, there may be hunger in their households (Ankomah, 2001).

The sources of livelihoods for rural households fall into three main categories, namely, grants or transfers (remittances), exchanges and agriculture. Very few rural households rely on single source of livelihood. Most of the time rural households obtain livelihood outcomes by combining different livelihood strategies. Agriculture has lost its overall importance for the majority of rural African people (Hebinck & Lent, 2007). Nowadays, rural livelihoods revolve around migratory labour, remittances and social grants (pension). The majority of rural people rely on combining sources, and most common source of livelihood strategy consists of combining transfers with farming (crop and livestock production). Crops and livestock production or farming can be the best livelihood strategy in attaining food security. Food available to a household is dependent on what the household grows, its purchasing power, and food preferences (Rizvi undated).

The food insecure rural households are not capable to manage food even through the combination of different livelihood strategies (Khatri-Chhetri & Maharjan, 2006). Ziervogel *et al.* (2006) stated that food access depends on the ability of households to obtain food from own food production or stocks, purchases, gathering, or through food transfers from relatives, members of the community, the government, or donors.

Gilimani (2005) stated that crop production is an important livelihood activity for households in South Africa's former homelands especially in areas where arable land is available and climate is conducive for cultivation. The rural households in former homeland areas are involved in crop and livestock production with other livelihood activities. The main crop grown in rural areas is maize, together with vegetables which include butternut, cabbages, spinach, potatoes, pumpkins, carrots, tomatoes, carrots and others (Gilimani, 2005). In the Eastern Cape, Monde (2003) mentioned that rural household consumption from crop production is seasonal, meaning it is not occurring throughout the year.

2.13 Role of technology adoption by small-scale farmers

Small-scale farmers are labeled with many names such as peasant farmers and subsistence farmers. Small-scale farmers depend on many things for example, the type of farm owned and geographical location. Small-scale farmers own arable land of one-to-four hectares and over the years they have been described as farms with limited resources, family farms and farms that have low surpluses for sale. They have also been associated with poverty (Gebremedhin & Christy, 1996). According to Ozowa (1995) a small-scale farmer depends upon his competence in the utilization of his basic production resources available and small-scale farmers make a major and important contribution to the national product.

Small-scale farmers practice farming for survival while large scale farmers' motive is to maximise profits. Rose & Tapson (1984) stated that small-scale farmers are known as those farmers that sell directly to the public as their market and these markets are places like schools, pension payout points, buses, road stops, auction points and streets close to the main roads.

Phillips (1987) defined technology as the artificial capability created by people to facilitate the manipulation of physical things. Small holder farmer's agricultural growth in the short term depends on rising productivity through the application of new agricultural technologies such as fertilizer, herbicides, pesticides and improved varieties and agronomic practices (Dadi *et al.*, 2001). Marinova (2006) stated that there are three broad types of modern agricultural technology; Firstly, there is biochemical technology composed of a package of high yielding varieties of seeds, chemical fertilizers and pesticides and irrigation water controlled in terms of timing and volume of irrigation.

Secondly, there is biotechnology consisting of commercially acceptable techniques which use living organisms or parts thereof to make or modify a product; this includes modifying or improving or manipulating the characteristics of economically important plants and animals and their derivative products, and developing micro-organisms which act favourably on the environment for agricultural production. Thirdly, is mechanical technology that indicates various degrees of mechanization of agricultural operations and ranging from simple traditional hand tools to animal and engine powered equipment, implements and farm machinery. This threefold distinction of modern agricultural technology is a conceptually useful one: in some important respects, it is inevitably an arbitrary one. Mechanical technology and use of mechanical devices are usually essential for irrigation; and control over the timing and volume of irrigation water is a crucial factor for the success of the biochemical technology package consisting of high-yielding seeds, chemical fertilizers and pesticides. Similarly, development of improved crop varieties is also a major area of research in biotechnology through techniques such as tissue culture, somatic hybridization and genetic engineering.

Agricultural technology adoption is influenced by many components within the decision environment which farmers operate in, such as limited access to information, lack of credit, farm size, aversion of risks, capital access, tenure arrangements, availability of farm equipment, age, level of education, size of household, livestock ownership, management skills, distance to commodity market, family size (Dadi *et al.*, 2001, Robitaille, 1992 & Fufa, 2006).

2.13.1 Role of technology adoption by small-scale farmers

Many researchers have talked about technology to the farmers globally, but it has not been acknowledged by the farmers because the farmers feel that it is impractical (food and fertilizer technology center, 1998-2007). According to Rauniyar (1990) adoption of improved agricultural technologies and farming practices has been for many years a major factor that contributes to agricultural productivity. The following section describes the possible outcomes or the good results that are derived from technology adoption by small-scale farmers.

According to Finan (1998), adoption of improved agricultural technologies and farming practices has been for many years a major factor that contributes to agricultural productivity growth achieved in developed countries. There are many roles played by technology in small-scale farming that can help better the small-scale farming sector and this is why technology has been

generated. According to FFTC (2007), the main aim is to inform the farmers about it so that they can adopt it. Gouse *et al.* (2005) mentioned that technology adoption by small-scale farmers can create income benefits for them as well as large-scale producers, input suppliers and as well as consumers in developing countries.

2.13.2 Increase productivity and poverty reduction

According to Feenstra (1997) “the prospect of enhanced agricultural production offered by improved agricultural technologies is recognized as essential to improving the household food security of small-scale farmers, raising rural income and creating national surpluses that can provide the basis for economic growth”. Anonymous (2007) stated that in our living days more than one billion of people in the world live on less income and the majority of people are poor and malnourished, directly or indirectly depend on agriculture for their livelihoods so it is essential for subsistence farmers in developing countries to be more productive.

2.13.3 Generate income and saves costs

According to Doss (2003), in most of the world’s poorest countries, especially the countries on the African continent, agriculture continues to be a leading source of employment and to contribute large portion of national income, for example the use of GM technology has been found to help raise the farmer’s profitability and income like in Argentina in year 2003, roundup ready soybeans have lowered direct costs and increased returns (IPC, 2004).

A quote from Bizimana *et al.* (2002) stated that “On an average, farmers who have adopted relatively more recommended technologies tend to produce significantly higher yields per hectare and achieve relatively higher net farm income per hectare than farmers who have adopted less and/or those who have not adopted recommended technologies. This therefore adoption of fertilizer is likely to raise variable cost so adopters and non-adopters do not face the same costs structure.

Gouse & Piesse (2005) stated that the circumstances under which this income creation can take place are shown to depend on a wide range of factors applicable across dualistic agricultural practices in South Africa.

According to Ozowa (1995), the generation of technology leads to wider adoption of labour saving technologies such as tractors, direct seeding and threshers. Even though recent variety

adoption increases labour use per hectare by increasing labour requirement for crop care and harvesting, methods such as mechanization and direct seeding will reduce labour requirements, impacting negatively on landless households.

2.14 Induced innovation model for technology adoption by small scale farmers

The Induced innovation model is a combination of four main elements as shown in Figure 2.3. technology, institutions, resource endowment and culture. It is argued that ‘shifts in the demand for institutional innovation are induced by changes in relative resource endowments and by technical change’ (Ruttan & Hayami, 1984). These four elements of the theory are import and for the purpose of this study “technology” element is the main one.

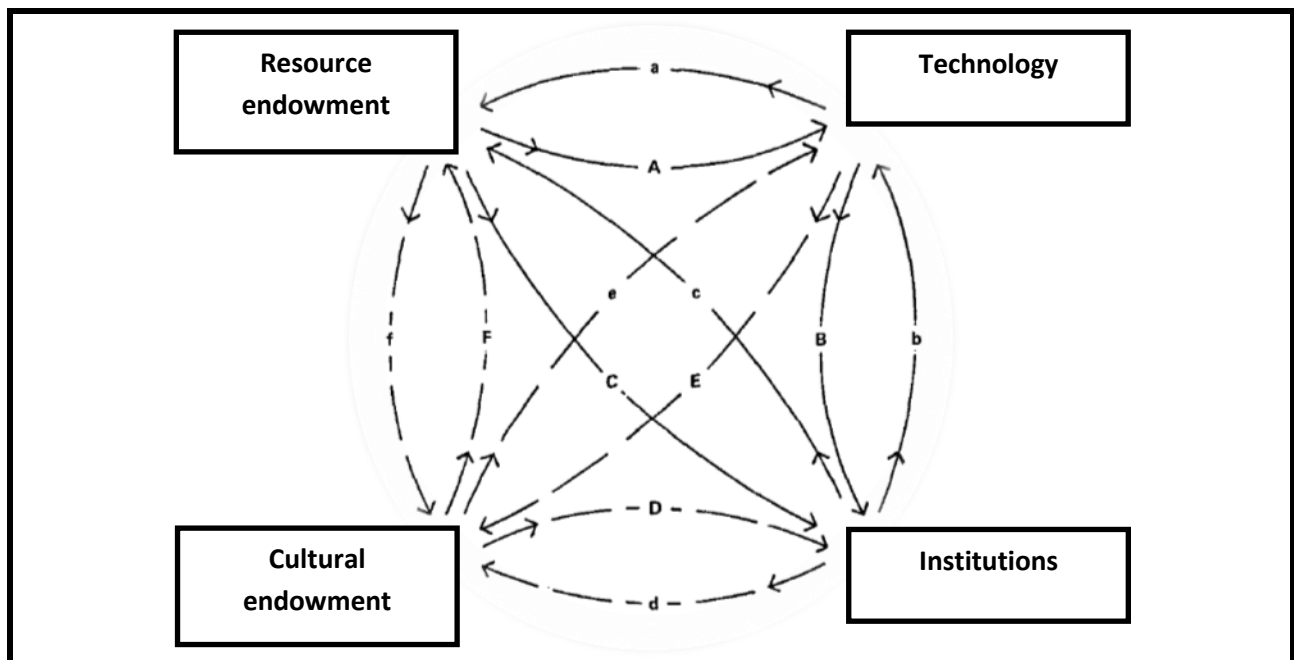


Figure 2. 3: Interrelationships between changes in resource endowments, cultural endowments, technology and institutions (Source: Ruttan & Hayami, 1984).

According to Ruttan & Hayami (1984), the theory of induced institutional innovation revolves around these four concepts. However, of the four concepts economists find three of them (resource endowment, technology and institutions) easy to incorporate in the model of induced innovation. Most criticism of the theory lies on the fourth concept, culture. Others argue that cultural endowment, ideology or values makes it impractical to generally treat institutions as an endogenous variable (North & Thomas, 1970, Grabowski, 1988 & Field, 1984).

2.14.1 Resource endowment

The long-run changes in the relative prices of factors and goods are some of the major reasons behind many of the changes in property-rights arrangement in history.

2.14.2 Technology

In the theory of institutional innovation lies the argument that there are multiple paths of technological development in agriculture and such paths induce change in the institutions governing the people to ensure efficient allocation of resources and the smoothness in the economic system (Koppel, 1995).

2.14.3 Cultural endowment

According to Lin (1989) the most important institutional arrangement that exists to reduce the costs of providing the services of other institutional arrangements is ideology. He defines ideology as a set of beliefs about the world that tend to judge morally the division of labour, income distribution, and the existing institutional structure of a society. A successful ideology must thus also overcome the free-rider problem. Lin (1989) and North & Thomas (1970) view ideology as an economizing device for the recognition of the world. For an ideology to be effective, it must conform reasonably well to an individual's experience of the world. As the world changes and individuals' experiences accumulate, their perceptions of a fair world also change. A successful ideology must also be flexible enough to capture the loyalty of new groups and retain the loyalty of older group.

2.14.4 Institutions

Institutions are divided into institutional arrangement and institutional structure. An institutional arrangement is defined as a set of behavioural rules that governs a specific pattern of action and relationships. An institutional arrangement can be formal or informal (Lin, 1989; North & Thomas, 1970). Examples of formal institutional arrangements are families, firms, labor unions, governments, future markets, etc. In contrast, values, ideologies, and customs are just a few examples of informal institutional arrangements. Lin (1989) indicates that economists use the term institutions to generally refer to an institutional arrangement. A second concept is the institutional structure, which is defined as the totality of institutional arrangements, both formal and informal, in a society (Lin, 1989).

The linkage among these four sets of elements is not linear in nature. Therefore, the analysis cannot only flow unidirectional from one element of the dimension to institution nor can one analyze it from only institution to the other element. The links move in all directions, and the system is better represented by four dimensions. Continuous feed-backs among the elements in all axes lead to a simultaneous determination of change in the institutions governing individuals and groups (Grabowski, 1988).

The theory of induced innovation uses history to conclude on the issues related to the pattern of institutions and technical changes. The driving force of change and the concept of causation are the cornerstone of the theory. It is through the historical pattern that this theory was developed and it helps in the prediction of the direction the agricultural sector will follow. Policies are suggested in order to positively drive the change (D'Haese & Kirsten, 2006).

2.15 Food Security in South Africa

According to Agarwal (2011) it has been identified that the world population growth and global development achievements resulted to a higher food demand aggregates. Also an increase in global oil prices led many countries to invest more in alternative sources of energy, including biofuels. According to (FAO, 2010) an alternative strategy used for biofuels indicated that an estimate change to the contribution of about 20-30 percent of the food prices increases. A food price increase in year 2008 has led to a diversion of about 125 million tonnes of cereal food into biofuel production. At the world food summit held in 1996, 2002 and 2009 the world leaders promised to reduce hunger. The main goal that was committed in the summit was to reduce by half the world undernourished population between the years from 1990 to 1992 and as well from 1992 to 2015. As the Millennium Development Goal (MDG) say “to halve the proportion of people suffering from hunger between 1990 and 2015”. The number of people undernourished was very high in 2010 compared to the situation in 40 years back, and yet the MDG number one seems unattainable in various countries (FAO, 2010).

According to Young (2001), the concept of food security has developed over the past three decades and the concern has focused more on the ability of countries to secure adequate food supplies. However, food is not only a concern at international or national level. It is also a paramount issue at grass roots level especially in poor rural communities. Recent research has

revealed that subsistence food production is increasingly important in some countries, mainly as a fallback against a backdrop of inflation and a proliferation of cash needs. HAI (2008) reports that continuing inflation of international food and oil prices is causing an escalating food crisis in developing countries, which as a result, are taking steps to combat food insecurity.

The FAO (2007) defines food security as a condition where all people at all times have physical and economic access to sufficient safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life. This shows that asset endowments and their combinations are the construction of a livelihood.

Oxfam (2008) reveals a livelihood approach in assessing food security at a conceptual level. The livelihoods approach to food security simply entails emergency programming to support livelihoods and save lives. Subsistence production may be seen as an emergence program that can be utilized by poor rural people to save their lives from hunger and ensure future consumption. Emergence programming means more than to give food hampers or aid to the needy, rather it is to have a defined response to a need (hunger or famine) by engaging in activities that adapt, help cope and sustain and build against resilience stresses and shocks such as hunger and famine. For rural households to maintain food security and safety, subsistence production has become the main activity or program to save livelihoods.

South Africa is a country that is known to be food secure at national level, but at household level food insecurity does exist (Ladzani, 2009). According to Labadarios *et al.* (2009), food security at national level occurs when the country “is able to manufacture, import, retain and sustain food needed to support its population with minimum per capita nutritional standards”. Food security status at national level is determined using two major indicators (i) the measure of projected food supplies (“calculated as domestic production (Gross Domestic Product (GDP)” that also includes farming, plus commercial imports minus non-food uses) as well as (ii) the measure of the nutritious food supply (i.e. “which is measured using the difference between projected food supplies and the amount of food needed to support the nation with individuals who earn the least amount of money”) (Labadarios *et al.*, 2009). Food security at household level takes place when there is food availability as well as access to food by a household (Labadarios *et al.* 2009). According FANRPAN (2006), hunger and malnutrition in South Africa are not caused by the shortage of food rather it is caused by inadequate access to food by certain categories of

individuals and households within the population. Women and children are said to be more vulnerable to food security.

“The World Bank refers to food security as, access by all people at all times to enough food for an active, healthy life”. The meaning of food security (or insecurity) is not as obvious as it may seem. There is no specific and accepted measure of food security in South Africa, and currently there are no regularised ways of monitoring it. This is not an acceptable state of affairs in a middle income country that has such a high proportion of food insecure households. Food security is multidimensional in nature and changes over time, making accurate measurement and policy targeting a challenge. There is sometimes confusion between national food security and the actual experience of households of obtaining food (Van Zyl & Kirsten, 1992).

Adopting new seed technologies can increase yield as compared to traditional varieties grown by smallholder farmers in South Africa (Ebro, 2001). Improved seed technologies for example Open pollinated varieties (OPVs) can have characteristics of being more variable in flowering times and have increased drought stress mostly during flowering (MacRobert *et al.*, 2007). This offers more stable yields than other varieties. According to National Department of Agriculture (NDA), 2006), food insecurity in South Africa has been a continuous threat. Therefore, the adoption of improved seed varieties may address the challenge of food insecurity in South Africa (Mashingaidze, 2006).

Most developing African countries depend on imports for their food security, where the vast majority of small scale households, especially in rural areas, are net food buyers (IFAD, 2009). The majority of South Africans do not produce their own food but rather buy their staple foods from commercial produces (National Department of Agriculture (NDA), 2006). This poses a threat on food security and imposes a heavy burden on the importation of food.

According to NDA (2006) food insecurity in South Africa has been a continuous threat for more than a third of the population. With food insecurities, people have to deal with problems of under-nourishment. Braun (2008) indicates that food insecurity is associated with a number of problems that include hunger, underweight children and chronic diseases. According to HSRC (2009), Food insecurity can be characterized as either chronic or transitory. In its chronic form, it

interprets into a degree of vulnerability, such that it is related with the consumption of inadequate or nutrient-poor diet, ill health, delayed development as well as increased infant mortality in severe and extreme cases). Consequently, the effects of poor health among poorer people manifest in various ways and, within households, are often associated with diminished ability to obtain work and to generate income (Brock, 1999). Here in South Africa, food insecurity may be implied by unemployment and lack of income. Food insecurity may occur at four different levels, namely the national, regional, community and household levels (FAO, 2003). Food insecurity causal factors and the level at which these causal factors occur include the economy or the level of income of the country, community or individuals (considered as the immediate causal factor); the biology (age, gender, ethnicity/culture) of individuals (also known as the non-modifiable causal factors); and the job availability defined as the employment status, education level, socio-demography and political environment (also known as the modifiable causal factors) (HSRC, 2009).

2.16 Small-scale irrigation technology

A lot has been written about irrigation technology, including smallholder irrigation, in South Africa. As part of the general profiling of the agricultural sector and efforts to evaluate the impact of diverse development programmes, several studies have been done and this section examines the key ones. Since much of the irrigation schemes implemented in South Africa and elsewhere in the developing world have grown out of specific theoretical traditions, the review will highlight some of these underlying theories and hypotheses.

2.16.1 Irrigation development and agricultural production

The importance of irrigation technology in agricultural production has been recognized for a long time and can be discussed within the broader framework of the role of improved technology in agricultural development. The induced innovation model theorists have made an excellent case for technical change in the process of agricultural development, looking at how production coefficients change as a result of changes in resource allocation (Hayami & Ruttan, 1971; Grabowski, 1979; Ruttan & Hayami, 1984).

The major contribution of the model has been to explain the mechanism underlying the choices society makes among alternative technological paths to achieve agricultural development. Prior

to the elaboration of the model, the thinking had been that technical change and institutional reform were exogenous to the system. However, the induced innovation model provided a firm basis for treating technical change as endogenous to the system because internal pressures exerted from the constraints imposed on the system by changing resource endowments are the major factors driving change (Ruttan & Hayami, 1984). Much of this thinking has informed the development and use of irrigation technology to bring about rapid improvements in agricultural development.

Irrigation can be defined more formally in this review to set the context for the discussions and for purposes of standardizing the concepts employed within the study. Irrigation has been described quite broadly as the artificial application of water to land or soil for clearly-defined purposes which may be agricultural, industrial or even aesthetic, for instance in landscaping and re-vegetation scheme. The Mesopotamian plains are reputed to be the sites of the first systematic use of water in this form for purposes of growing crops throughout the year (Hill, 1984). There is strong evidence that adequate supply of water leads households to shift from traditional self-sufficiency goals to profit/income-oriented decision-making and resource allocation where farm output becomes more responsive to market trends (Chirwa & Matita, 2011). Kimsun, Socheth & Santos (2011) state that recent econometric study by Dillon (2011) illustrate a robust story that irrigation technology causes a shift of cropping patterns in favour of high value cash crops, culminating in increased value of crop production, greater investment in farm equipment and durable assets, with overall positive impact on socioeconomic status of smallholders with respect to such indicators as income, nutrition and health.

The Dillon study makes the interesting claim that reduced poverty and inequality result from increased adoption of irrigation technology. The International Programme for Technology and Research in Irrigation and Drainage (IPTRID) (1999) stated that irrigation also increases physical output and the value of production through intensification of cropping and innovation in crop choice. Riddell *et al* (2006) highlighted that introduction of irrigation most commonly improves the overall level of quality and leads to less variation in quality between producers and from year to year. The authors further assert that increased use of irrigation extends the cropping season to allow for multiple cropping, permits new commercial crops and varieties to be grown, thus providing much wider opportunities for farmers to be part of the mainstream economy.

In the context of sub-Saharan Africa where rain-fed agricultural production is still prevalent and predisposes the system to immense risk, it is argued that only the inter-seasonal and inter-annual management of water offers a means of buffering regional production shortfalls. Beyond this, the concentration of inputs around irrigated production offers a means to service specific export-market demand (Riddell *et al.*, 2006). As a vital resource in agriculture, irrigation water contributes to several productive and livelihood activities. With the common belief on the important role of irrigation in agricultural growth, many developing Asian countries have promoted irrigation development over the last five decades to achieve such broad objectives as economic growth, rural and agricultural development, employment and wages, education and overall socio-economic welfare (Hanji, 2006).

According to FAO (2009) irrigation brings a range of potential changes in agricultural production. Previous research by Lipton & Litchfield (2003) declared that first direct impact of irrigation is on output levels. Irrigation boosts total farm output hence, with unchanged prices, raises farm incomes. Achieving such non-inflationary growth in output is particularly attractive in an era of dwindling real incomes as a result of general increases in prices that have ignited intense protests some of which have turned deadly as was witnessed recently in the North-West Province of South Africa (SABC, 2012).

Several studies, notably Hussain & Hanjra (2004), Pundo (2005) & Hagos *et al* (2009), suggest that increased output levels in irrigated farming may arise for any of at least three reasons. Firstly, irrigation improves yields through reduced crop loss due to erratic, unreliable or insufficient rainwater supply. Secondly, irrigation allows for the possibility of multiple-cropping, and so an increase in annual output. Thirdly, irrigation allows a greater area of land to be used for crops in areas where rain-fed production is impossible or marginal. Hence irrigation is likely to boost output and income levels.

Higher yields, higher cropping intensity and all year-round farm production lead to increased market-oriented production, implying a shift in supply (marketable surplus production) and perhaps food Security (Hagos *et al.*, 2009). The recent study by Gebreselassie (2010) showed that the introduction of irrigation scheme resulted to changes in cropping pattern which led to a significant improvement in the commercialization of smallholders in Ethiopia. Similar results have been observed in other parts of Africa and Asia. It has been shown that farmers who have

adopted irrigation technology have generally responded positively to the intervention as both cropped area and the number of cash crop growers increased after the introduction of irrigation technology.

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

2.16.2 The Economic case for irrigation in agriculture

According to FAO (2009) irrigation brings a range of potential changes in agricultural production that fall under the class of economic benefits. As highlighted in broad terms above, studies carried out by the International Programme for Technology and Research in Irrigation and Drainage (IPTRID) (1999) have shown that irrigation can increase output and value through intensification of cropping and innovative choices in crops cultivated. It can also extend the cropping season to allow multiple cropping, improve the quality of produce and permit new commercial crops and varieties to be grown. Since for agrarian, resource-poor households it is virtually impossible to achieve sustainable poverty alleviation without commercialization of farming, the promise of increased output of commercial crop makes irrigation highly attractive (Chamberlin, 2007). Studies elsewhere in Africa and Asia have shown quite clearly that substantial economic benefits accrue to growers who use one form of irrigation or the other (Von Braun, 2003; IWMI 2005; Bhaduri *et al.*, 2007).

A comprehensive assessment of socio-economic impacts of agricultural water uses carried out by IWMI as part of its multi-country projects showed that new opportunities for reducing poverty are presented by irrigation schemes as a result of the substantial amount of economic benefits they generate. Among these, IWMI (2005) lists the direct benefit of employment generation, larger incomes resulting from increased outputs rather than rising prices, and higher returns to

investment that are associated with irrigation technology. These points have been made in different ways and at different times by Von Braun & Kennedy (1994), Timmer (1997), Pingali (1997), Dorward *et al.* (1998); Shepard (1999), among others, making links between irrigation use and poverty reduction through output expansion that is both driven by and elicits credit expansion, emergence of input and output markets, and improvements in quantity and diversity of consumption goods. Chamberlin (2007) suggests that households who derive increased incomes from irrigated agriculture deploy these more efficiently to household consumption than subsistence-oriented producers.

There are also economic benefits that accrue beyond the household unit and indirectly account for noteworthy livelihood enhancements for rural communities and resource-poor farmers alike. Riddell *et al.* (2006) have drawn attention to the impact of irrigation schemes on market development as well as in improving the market efficiency of . In that regard, these authors have stressed that the impact of a localized increase in production from, for example, a new irrigation scheme depends critically on the structure of the market into which the commodity sells and the impact that the production has on the structure of the market. A fair amount of systematic research has also been conducted to assess the scope for irrigation schemes to lead to enhanced marginal returns on investment in irrigation technology (Kimsun *et al.*, 2011). Their study examined the impact of irrigation on household assets for a sample of 220 households enumerated over a two-year period in Cambodia. The findings were inconclusive on the exact nature of the relationship between irrigation investment and accumulation of household assets such as durable assets, livestock, farm equipment, farm animals and animal traction equipment.

Despite the inconclusive result in respect to the link among these variables, the study seemed to point to the possibility of a link with human capital which might in some way be related to the availability of the afore-mentioned assets through their effect on earning potentials and access to other resources and services. The study explained the rather surprising result in terms of the fact that irrigation in Cambodia was not functioning optimally (Kimsun *et al.*, 2011). The implication is that a better functioning system would show a closer link between household asset levels and investment in irrigation technology, a situation that seems closer to reality. The expectation was therefore that a different pattern of relationships would be expected for South Africa which is

clearly better-organized than the situation in Cambodia where frequent ethnic conflicts have ensured that the environment is highly unstable and volatile.

In that respect, recent assessments carried out by Van Averbeke & Khosa (2007), Oni, Maliwichi, & Obadire (2011) and Tekana and Oladele (2011) were reviewed. The results for the study conducted by Van Averbeke and Khosa (2007) in Limpopo Province revealed that irrigation use was associated with improvements in household income for the smallholders included in the study. The study made the assessment from the standpoint of food security and measured the probability that the household would meet its food security needs from its earnings which was measured as Adult Equivalent (AE) income. The interesting result from the standpoint of the link between asset ownership and irrigation was the finding that those households that earned higher income also owned more culturally-defined “luxury” items such as bicycles and radios which agreed with findings made in the mid-1980s in the northern part of KwaZulu-Natal Province by Tapson *et al.* (1986). The study by Tekana & Oladele (2011) in North-West Province reached similar conclusions regarding the relationship between income (proxied by per capita expenditures of survey households) and participation in irrigation scheme. Oni, Malawichi and Obadire (2011) compared dry land farming and irrigated farming in the Vhembe district of Limpopo Province and found that farmers participating in irrigation schemes owned considerably more assets than those who did not irrigate (that is those who engaged solely in dry land farming).

2.17 Summary of the chapter

A lot has been done in sub Saharan Africa to address the issue of food security in communal areas. The burgeoning literature on the subject suggests that irrigation is one of the key indicators in addressing household food security as it brings a number of benefits to the farmers. The theoretical and conceptual, as well as policy, arguments are compelling. The South African government and private sectors need to come together and assist smallholder farmers in improving irrigation technologies to improve the situation of economic growth and development in the communal areas. Irrigation development in rural areas can hold the key to household food security and improved incomes as highlighted in this chapter.

CHAPTER 3

DESCRIPTION OF STUDY AREA

3.1 Introduction

This chapter describes the study areas where the active irrigation schemes of the governmental and non-governmental farmer groups are located. Eastern Cape in terms of its geography is firmly described in the first part. This is then followed by the more specific description of Intsika-Yethu Municipality. The description of the study area is important because it familiarizes one with the area in which the study was carried out (Jari, 2009). The description of the study area looks mainly at the physical and socio-economic settings that clearly set the geographic context of the research.

3.1.1 The Eastern Cape Province

The Eastern Cape Province of South Africa lies on the south-eastern coast of the country where Indian Ocean meets the land of South Africa (see Figure 3.1). A guide book used by the Tourist extravagantly shows a great natural beauty, particularly the rugged cliffs, rough seas and dense green bush of the stretch known as the Wild Coast (Figure 3.2). The province also features diverse climates and landscapes which range from the dry and desolate Great Karoo to the lush forests of the Wild Coast and the Keiskamma Valley, the fertile Langkloof near Port Elizabeth, renowned for its rich apple harvests, and the mountains southern Drankensberg region around the town of Elliot.

In terms of land area, it is the second largest province after Northern Cape. In year 2001, the Eastern Cape Province occupied a total land area of approximately 169 580 km² representing 13.9% of the land mass of South Africa. Due to the provincial boundary changes since then, the latest Census results gives the Eastern Cape Province a land area of 168, 966 square kilometres (Statistics South Africa, 2011). This means that the province is roughly 13.8% of South Africa's total land mass (see Figure 3.3). If this study were to look also on the population side then, this will clearly shows a slight decline in the population of South Africa, denoted by a percentage decrease as from 13.9% in 2001 to 13.8% in 2011. District municipalities in the province are Alfred Nzo, Amathole, Cacadu, Chris Hani, Nelson Mandela Bay Metropolitan and

Ukhahlamba. The Eastern Cape Province is divided into 37 local municipalities and two metropolitan municipalities. The province is endowed with mountains, rivers, and savannah grass land with short shrubs and forests (Eastern Cape Department of Rural Development and Agrarian Reform, 2012). It derives its incomes from eco-tourisms, agro industries, livestock and crop production (Eastern Cape Department of Rural Development and Agrarian Reform, 2012). The provincial population increased by modestly over the intercensal period 2001-2011. According to the Census results, the population of the Province is estimated at 6.3 million and 60% lives in rural areas (Statistics South Africa, 2011). The government documents reviewed characterizes the province as featuring the following challenges:

- High levels of poverty,
- High unemployment,
- Under-employment
- Agriculture infrastructure backlog
- Poor public health profile
- Decline in life expectancy rate
- Low literacy rate
- High demand for housing, water, sanitation, social security and electricity.

The need for economic development and improvements in livelihoods of the population is therefore very high and much of the efforts of the government are focused on putting in place measures to reverse this trend as fast as possible. Average poverty residence rate in the province is about 75%, being worse in about four Districts namely O.R Tambo, Alfred Nzo, Joe Gqabi and Chris Hani. Unemployment rate is estimated at a whopping 35% (Department of Rural Development and Agrarian Reform of Eastern Cape Province, 2011). The official documents also put the number of social grant recipients at 2.5 million, representing nearly 40% of the population. Since these social grants are mainly received by the elderly, retired civil servants, disabled and children, this means that the province has a very high dependency ratio and

confirms its status as one of the poorest in the country (Department of Rural Development and Agrarian Reforms of Eastern Cape Province, 2011).

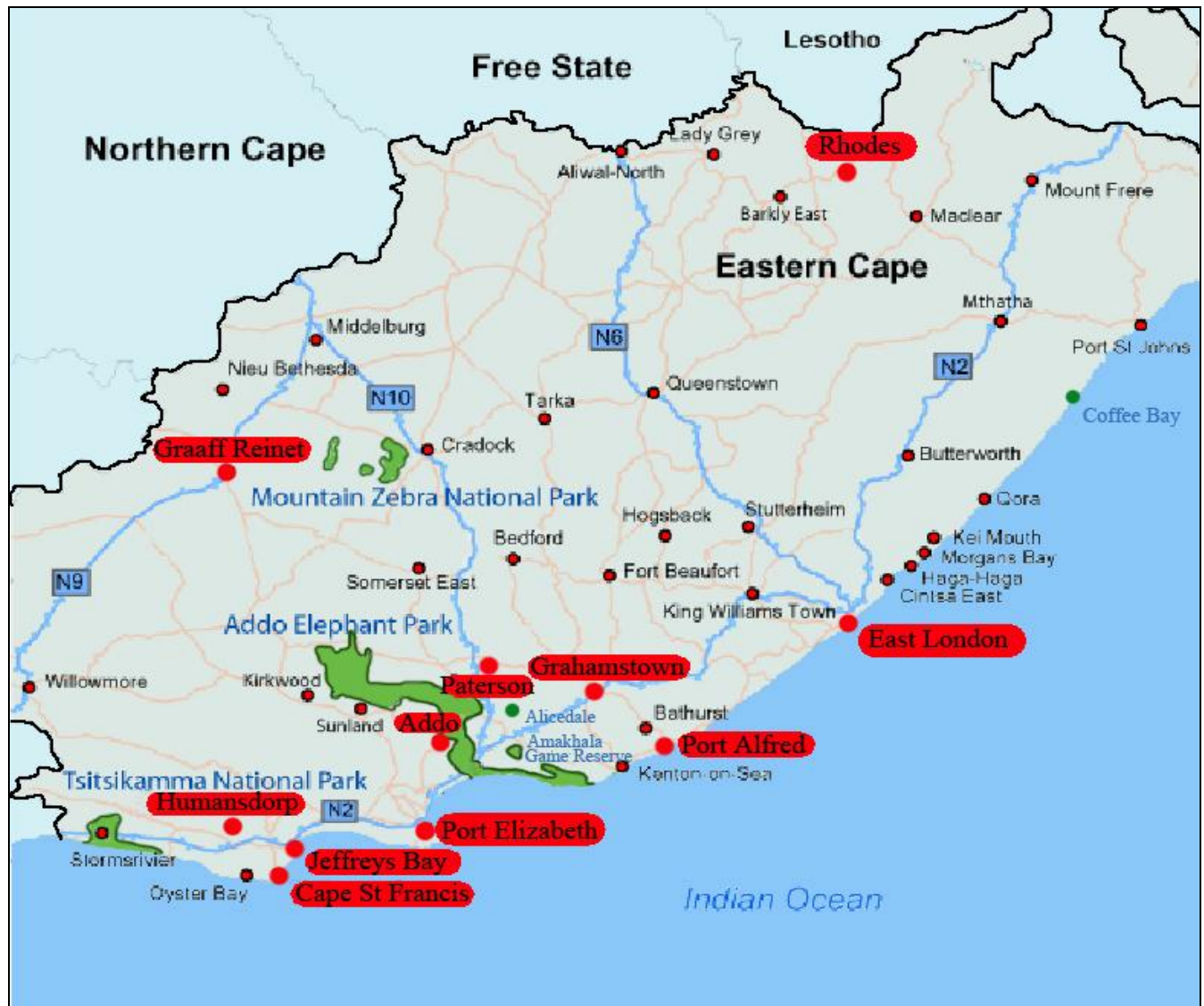


Figure 3. 1: The Eastern Cape Province Map showing the study areas

The current policy focus on poverty alleviation, job creation and food security is therefore understandable and is in line with what is happening elsewhere on the African continent where the goal of reducing poverty by half in 2015 is being pursued as part of efforts to meet the Millennium Development Goals (MDGs). Boosting agro-processing is also being pursued to expand employment opportunities as part of what the provincial government wants to do to demonstrate its commitment “to reduce under-development as outlined in the Millennium Development Goals (MDGs)” (Department of Rural Development and Agrarian Reform of

Eastern Cape Province, 2011). Given that the majority of the population is resource-poor and not in any position to produce sufficient surplus to feed these industries, the government is also focusing on empowering small producers and resource-poor households to operate homestead gardens and subsistence farms. In fact, the province has only few commercially organized large farms that make any appreciable contribution to the rural economy and the bulk of these are white-owned farms that fall outside the units of observation for the purpose of this study. Based on statistics from the Department of Rural Development and Agrarian Reform of Eastern Cape Province (2011), there is a decline in agricultural production and its contribution to GDP of the province.

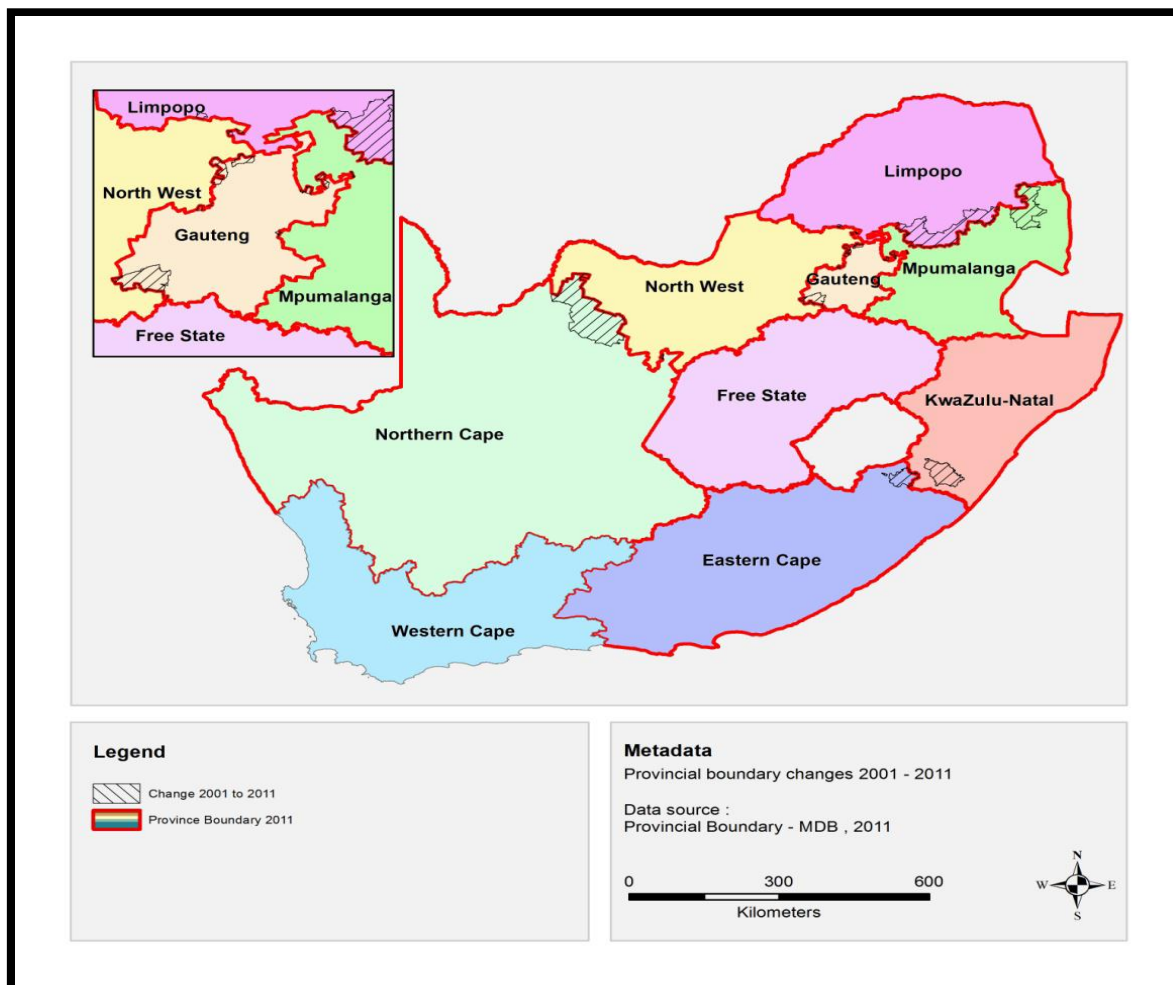


Figure 3. 2: Map of South Africa showing the provinces, 2011

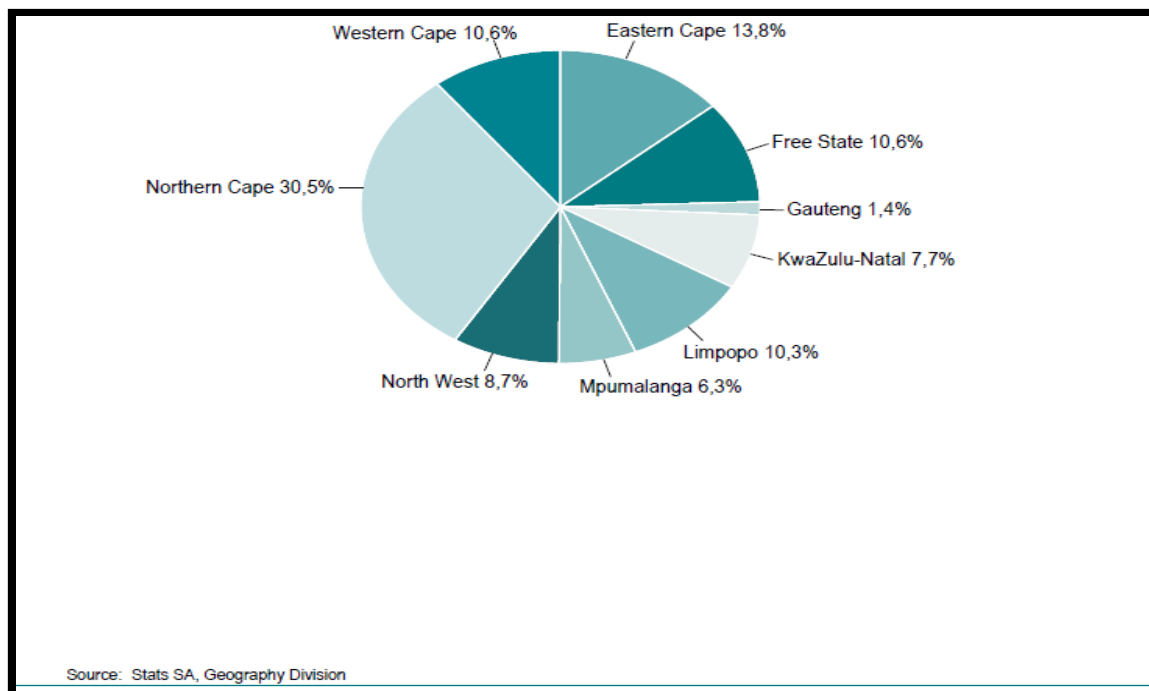


Figure 3. 3: Percentage distribution of land area by province, 2011

3.1.2 Climate

The climate varies from mild temperature conditions of 14⁰C to 23⁰C along the coastal areas to slight more extreme conditions of 5⁰C to 35⁰C among the inland areas (Lent *et al.*, 2000), cited in Mngomezulu (2010). Monthly rainfall ranges from the lowest between 6 to 86mm in Cofimvaba, the town where Qamata is located in the village.

3.1.3 Intsika Yethu Local Municipality

Intsika-Yethu Municipality is one of the local municipalities constituting the Chris Hani District Municipality of the former Transkei homeland of Eastern Cape Province. The two main towns of the municipality are the administrative headquarters of Cofimvaba and the agricultural hub of Tsomo. The municipality is made up of 213 villages (see Figure 3.4). Based on the latest ward demarcation exercise, the municipality has a total area of 2,711 km². While the 2001 Census results put the population at 194 246 persons in 44 768 households, with an average household size of 4.3, estimates in 2007 suggest a reduction of the population to 167 050. The recently released 2011 Census results report the municipality's population at 145,372 persons distributed across 40,448 households (StatSA, 2011). This reduction in the population is probably due to migration to more urban centres outside the Intsika Yethu Local Municipality. The IDP

document of the Municipality provides some information on the demographic structure including the gender ratio and the age distribution.

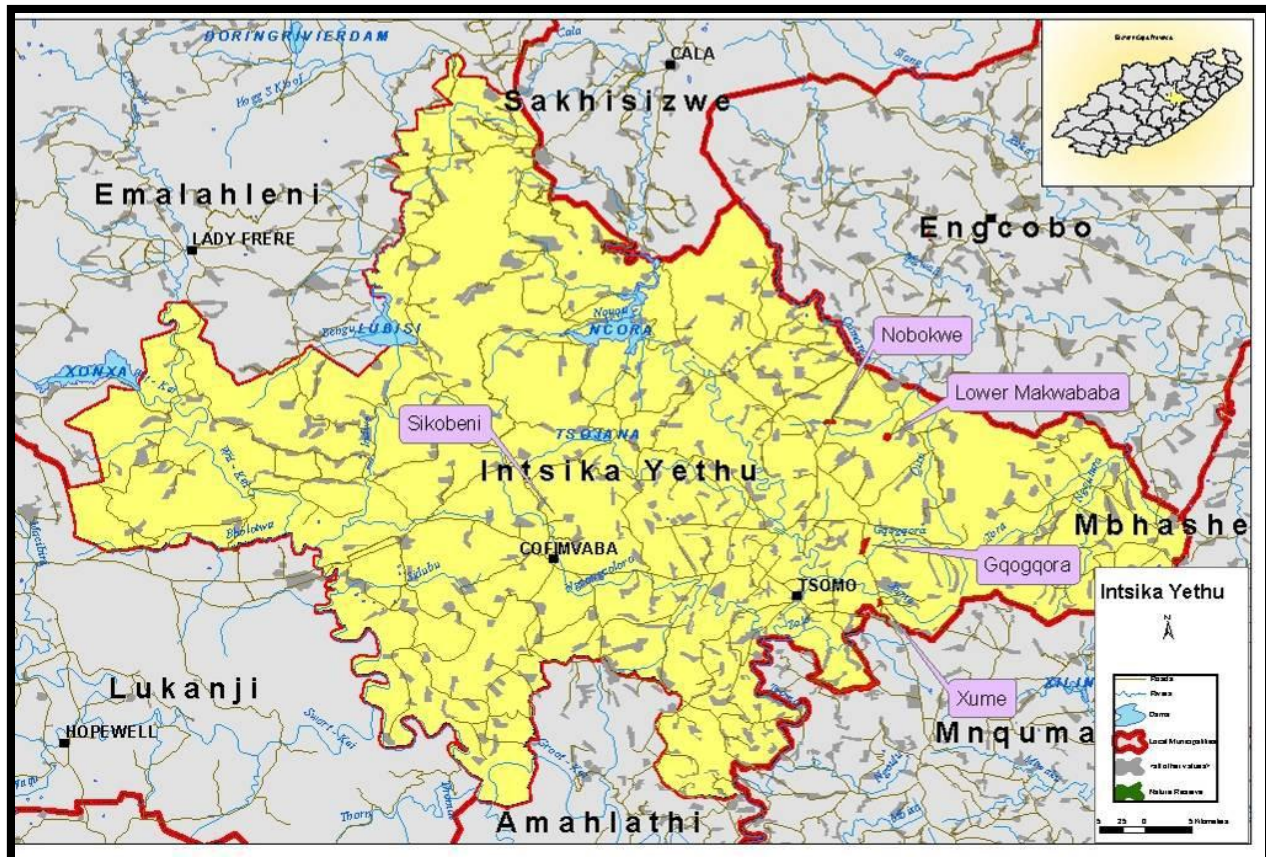


Figure 3. 4: Intsika Yethu Local Municipality 2004-2005

According to the reports, women make up about 55% of municipality's population. The indication is that dependency ratio of the municipality is very high with as much as 60% of the population falling within the school going ages of 0 and 19 years. A troubling statistic is the high rate of unemployment which was estimated in 2008 at 87.1% of the active workforce (IntsikaYethu Local Municipality, 2008).

Topographically, the municipality is located in the Grassland Biome with hilltops of the same altitude and Valley Rivers flowing in between these hills (Kodua-Agyekum, 2009). The municipality is drained by the Lubisi, Xonxa, Ncora and Tsojana rivers which form its major sources of water that are connected to valley water dams for irrigated farming. The municipality experiences both hot summers and cool dry winters with some snowing mainly on the highlands and mountain ranges. The area features low summer precipitations that range between 700mm

and 800mm annually. Sometimes it rains heavily during the beginning of summer leading to severe gully erosion (Intsika Yethu Local Municipality, 2008).

The municipality's rocky sandstone of the Clarens Group defines its soils that are categorized as shallow to moderately deep and highly weathered (Intsika Yethu Local Municipality, 2008). Beyond the shallow soils are red and purple mudstones together with shale. The shale soils can be described as fine-grained, elastic sedimentary rock composed of mud made-up of flakes of clay minerals and silt-sized particles of other minerals, especially quartz and calcite (Blatt & Tracy, 1996). The dry winter periods, high water evaporation due to high temperature, low rain falls, gully soil erosion and unpredicted weather patterns are a threat to the general productivity and profitability of the agricultural sector.

The major economic activities carried out on land include livestock grazing and smallholder crop farming. Most land in close proximity of homesteads show signs of heavy degradation due to overstocking, and poor veld management and farming techniques. However, villages still have huge tracts of uncultivated arable land. There is therefore a high rate of under-employment and the Municipal authorities are working hard to improve the access of the general population to productive employment in order to enhance their livelihoods.

The quality of life in the Municipality is also a source of serious concern. One indication of this is the poor quality of housing which mirrors the situation in most rural municipalities in the country. The Municipal authorities provide statistics that show that up to 76% resided in poor quality housing in 2008, and the indication is that the situation is not much changed today with gross monthly income averaging less than R1500 for most of the working population. Thus, innovative ways especially promoting smallholder commercial agriculture to boost the local economy that supports creation of more employment, improved household incomes and rural livelihood in general are urgently needed.

The municipality is faced with low public and private investment in trade, tourism and agriculture; low literacy levels and lack of economically viable productive skills in agricultural production, poor natural resource management, entrepreneurship innovation, and lack of access to credit. Poor and dilapidated infrastructures like irrigation facilities, feeder roads, housing and markets are also contributing to the poor performance of the municipality's economy. Moreover,

a restrictive land tenure system that is still heavily influenced by customs and traditions acts as a hindrance to potential investments in this area. It is understood that traditional rulers are not allowing farmers to expand their holdings beyond the erstwhile 1.5 ha each household obtained from the Apartheid administration.



Figure 3. 5: A typical homestead in the Intsika Yethu Local Municipality

3.2 Project area description

The study area, Qamata, is situated in the Eastern Cape province of South Africa. The Qamata area is located in the southwest of the former Transkei now part of the Intsika Yethu Local municipality whose administrative headquarters is at Cofimvaba (see Figure 3.6).

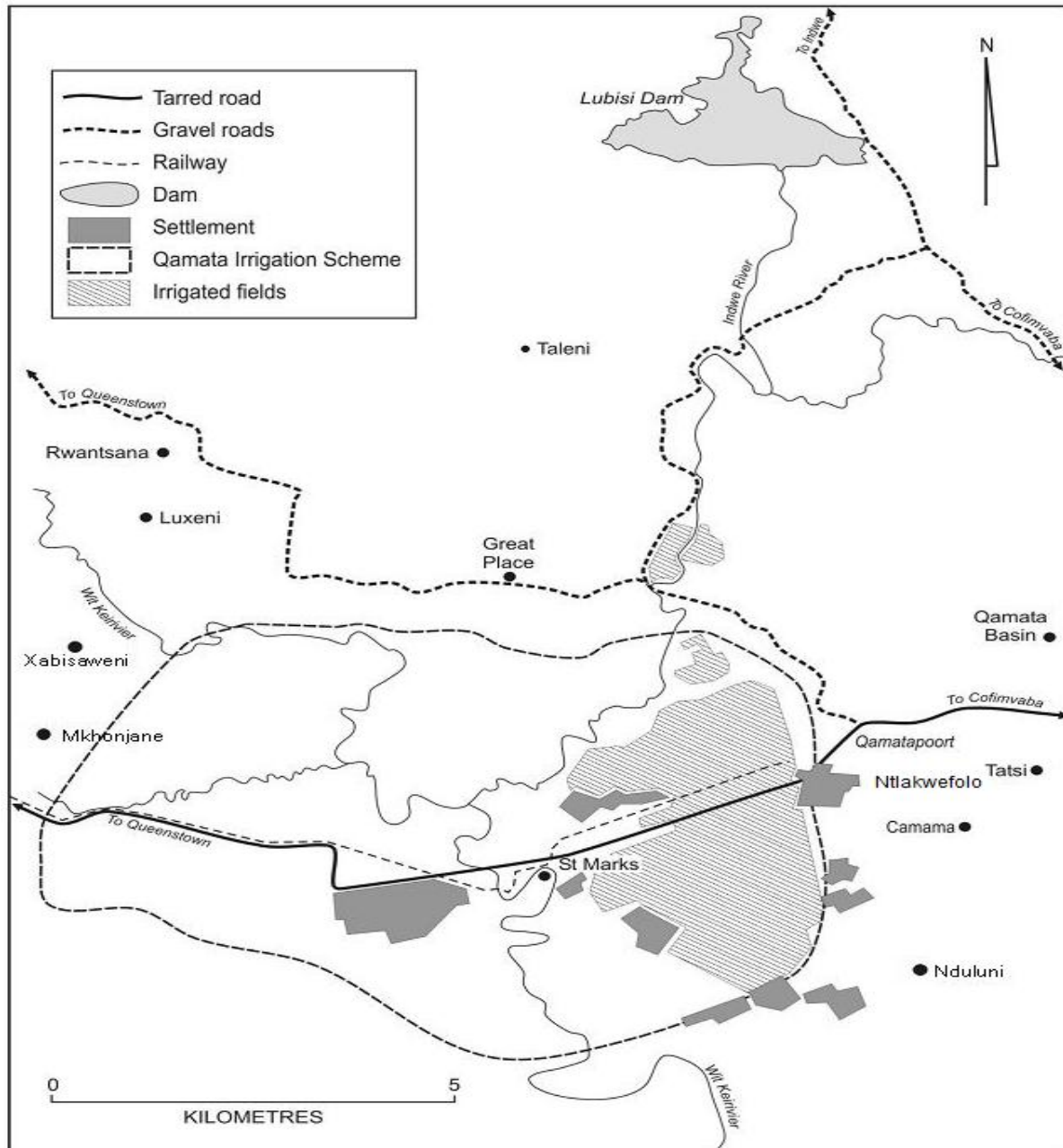


Figure 3. 6: Research Area-Qamata

It is constituted by the Qamata Irrigation Scheme (QIS) and nine villages surrounding the scheme, namely, Taleni to the north, Qamata Basin, Tatsi and Camama to the east, Nduluni to the southeast, Mkhonjane and Xabisaweni to the west and Luxeni and Rwantana to the northwest (Figure 3.5). This section of the chapter intends to orient the reader on major aspects of the physical environment which influence rural and agricultural development in the area. The economic, social and political dimensions of community life in the Qamata area, as revealed by years of fieldwork will be discussed.

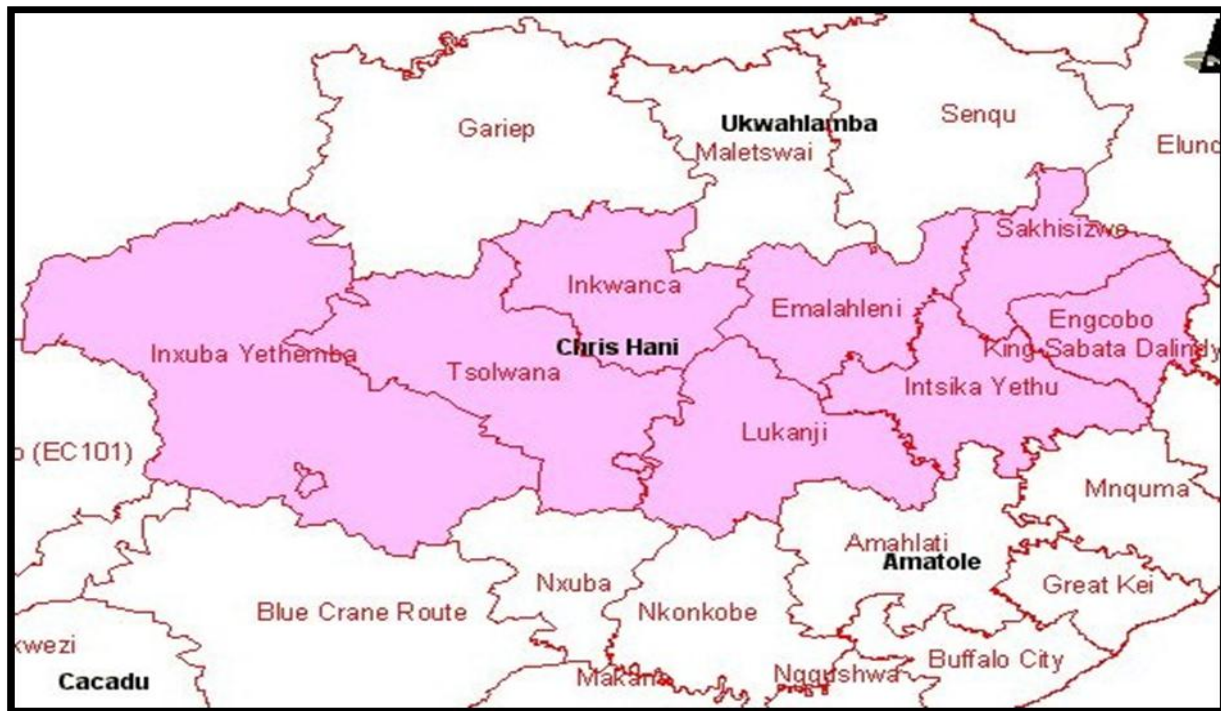


Figure 3.7: Map showing Chris Hani District Municipality
Source: SAExplorer, 2011

3.2.1 Physical setting

This section deals with the physical background of Qamata area and how it influences socio-economic development of the area. The approach is premised on the notion that rural people have to modify aspects of the physical environment (e.g. water supply and soil fertility) through the use of technology to step up agricultural production and to address the problems of poverty and deprivation (Bembridge, 1984). The knowledge of the physical background is therefore important to facilitate the understanding of the development policy required to cope with the

opportunities and constraints that the physical environment presents to social and economic development at Qamata.

3.2.2 Climate and rainfall

Regarding the production of crops, rainfall and temperature are the two most important climatic elements (Manona, 2005). This section will describe the climate and rainfall of Qamata. The Qamata area experiences a cool continental type of climate because of its location (Republic of Transkei, 1991). Rainfall averages 500mm per annum; it is highly unreliable in amount and distribution (ARDRI, 1996). The effectiveness of rainfall is reduced by high run-off and high summer temperatures. Recurrent droughts are common and so is total crop failure in the dryland farming communities. The climate of Qamata determines the amount of surface run-off available for irrigation, the types and variety of crops that can be cultivated and types and frequency of most natural disasters. Certainly, at Qamata Irrigation Scheme (QIS) the climate influences operation and maintenance policies relating crop selection, irrigation scheduling and risks and disaster management. On the other hand Cofimvaba as the town for Qamata normally receives about 553mm of rainfall per year, with most rainfall occurring mainly during summer (see Figure 3.8) (SAExplorer, 2011).

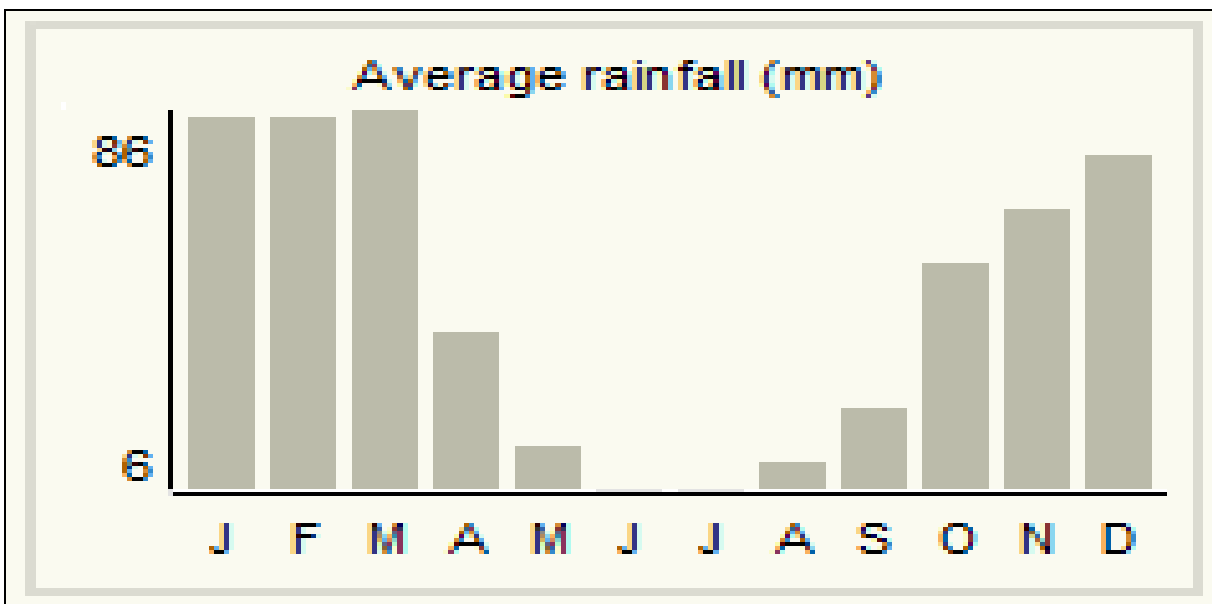


Figure 3. 8: Average rainfall (mm) for Cofimvaba per annum source: SAExplorer, 2011

3.2.3 Natural Vegetation

The highpoint vegetation of Qamata area (dry Cymbopogon-Themedaveld) has been invaded by thorn bush, creating a kind of false bushveld (Republic of Transkei 1999). Annual grasses and weeds dominate the landscape as a result of overgrazing. The problem of sheet erosion makes it difficult to re-establish grass on the bare land. Bembridge (1984) contends that “the nutritional status of the veld” is ideal for livestock farming. Besides, the light forests which occur along river valleys are exploited to provide for the fuel needs of the people. The average summer temperature varies from 24°C in September to 29°C between December and February. Winter is cold: the lowest temperatures are recorded in June and July when the level of mercury drops on the average to approximately 12°C. The area experiences winds of low to moderate speed and variable direction. Winds affect the production of crops such as tobacco, cotton and citrus (ARDRI, 1996).

3.2.4 Soils and soil erosion

The topsoil in the area consists mainly of alluvium (sandy loam). Of the 5 300ha of land in the basin originally earmarked for irrigation, only 47% is suitable for surface irrigation because the subsoil is less permeable (ARDI, 1996). Consequently, by the late 1980s 390ha of irrigated land was either saline or waterlogged (Maitin, 1990). Owing to low rainfall and low temperature conditions, the soils in Qamata area are generally less leached and more fertile than those developed under more moist conditions and cooler temperatures (Republic of Transkei, 1991).

3.3 Summary of the chapter

It can be concluded that Qamata area is characterized by moderate and humid temperatures with climate which are fairly favourable for agricultural activities. The weather conditions throughout the year and soils are good and encourage agricultural activities mostly crop and livestock farming. The village is one of the municipalities with the highest levels of rainfall and suitable temperatures, poverty, illiteracy and unemployment in the areas. High number of the population in this area depends on social grants as their source of income, as it has been estimated that 96 percent of the population in Qamata is unemployed.

CHAPTER 4

METHODOLOGY

4.1 Introduction

This chapter reviews the research methods used in collecting and analyzing data from emerging smallholder farmers in the Intsika Yethu local Municipality. The chapter is intended to show how the study was conducted using research tools. It starts by explaining the sampling technique and the sample size from which data was collected. The chapter goes on to describe the data collection methods. The section on data collection methods explains the tools that were used for collecting data and the variables that were collected. The analytical framework follows, outlining descriptive statistics and the model for data processing, giving reasons why the model has been chosen.

4.2 Data

The unit of analysis is the major entity that is analyzed in a study (Trochim, 2006). In this study, heads of household members of Qamata Irrigation Scheme (QIS) and non-members provided primary data and secondary data which were gathered through the use of interviews with the heads of households in Qamata. Some of the data were secondary data gathered from the internet, newspapers and literature under this study. A questionnaire was designed as a tool for primary data collection. The questionnaire was designed in order to collect both qualitative and quantitative data. The questionnaire was then administered to respondents (farmers) through face-to-face interviews. Face-to-face interviews were chosen because they have several advantages over the other methods. According to Bless & Smith (2000), an interviewer-administered interview is an important tool for data collection because it reduces omission of difficult questions by respondents. In addition, it reduces the problem of word or question misinterpretation (misunderstandings) by respondents and can be administered to farmers who can neither read nor write. Also, the presence of the interviewer increases the quality of the responses since the interviewer can probe for more specific answers (Leedy & Ormrod, 2004). In other words, the use of interviewer-administered questionnaires ensures minimal loss of data when compared to the other methods.

In this study households' heads for the families chosen to be part of the sample were interviewed. In the absence of the head, the spouse or any family member who is directly involved in the farming activities and management was interviewed. The main respondent provided most of the information, but was allowed to consult other household members where necessary.

The data collected included demographic data (age, sex, highest educational level attained, family size and income level), factors of production (land, labour, capital, human and natural resources), infrastructure development (roads, communication links and storage facilities) and transport availability, amount of crop and livestock sold at the market, market proximity and livelihood strategies adopted by farmers to overcome food insecurity in rural areas. The questionnaire was also used to reflect market information accessibility by farmers.

4.3 Sampling procedure

Sampling is a process of selecting units from a population of interest, so that by studying the sample, the results obtained from the sample may be generalized to the population from which the sample had been chosen (Leedy & Ormrod, 2004). Thus, the characteristics obtained from the sample should reflect approximately the same characteristics as the population. According to Bless & Smith (2000), in order to get reliable statistics, a sample should be large enough so that it gives a good representation of the actual population.

For purposes of this study, a sample of the households involved in the irrigation scheme was drawn randomly. For the sample to best represent the total population, a non-households head who were not part of the irrigation scheme-frame was employed. Bless and Smith (2000) define a sampling frame as a list of all units from which a sample is to be drawn. In this research, farmers were selected based on their willingness to participate. Non-probability sampling procedure was employed to sample households who were involve in irrigation scheme and those who were not. According to Bless and Smith (2000), non-probability sampling refers to a situation in which the probability of including each element of the population in a sample is unknown. Non-probability sampling was used because the study focused on respondents who

were willing to be interviewed. Fifty-three farmers from the irrigation project and non-irrigation farmers in Qamata Village were interviewed, bringing the total sample size to 70.

4.4 Data collection Procedure

The major issues discussed in this section are the instruments for data collection, notably the questionnaires used, and the interviewing procedure. Interviews were carried out by the researcher and his assistants who were taken from the university. Students studying post graduate degrees were the most preferred since the questionnaire required some numerical data and were able to speak the local languages in the area. Extension officers were also included as enumerators because the respondents (farmers being interviewed) were more open to them than the university research assistants.

The purpose of the study was explained to the research assistants and the data needs made clear. Knowing what is required for the study ideas were shared on how to approach the respondents in the various villages of Qamata. The study objectives and questionnaire were first discussed and explained to the sampled farmers. When the farmer was found to be willing to answer questions interviews progressed. All this was done, so that enumerators can establish good rapport and encourage respondents to cooperate and hopefully give honest and unbiased answers.

4.5 Data analysis

Statistical Package for Social Scientists (SPSS version 20.0) was used to run the data collected from smallholder farmers in the Qamata. To analyze data, descriptive statistics were used together with the multiple regression model. The main descriptive indicators that were employed are frequency and mean values for all the variables. These are useful in analyzing household characteristics as well as establishing the relationship between variables.

Multiple regression is a model that can be used to predict a dependent variable based on more than one independent variable. This model allows one to predict the impact of several independent variables on a dependent variable. In order to explain the relationship between several independent variables and a dependent variable, the study used multiple regression

model. Rigney & Associates (undated) refers to Multiple regression as a group of techniques which allows measurement of the degree of relationship between a dependent variable and independent variables. In practice, the multiple regression allows the simultaneous testing and modeling of multiple independent variables.

In this study the Multiple Regression model was used to determine the livelihood strategies adopted by smallholder farmer in improving household food security and welfare in Qamata area. The study envisaged the strategies and opportunities that smallholder farmers used to improve their welfare in rural areas. In this study, the multiple regression model was used to examine the impacts of such variables as gender, marital status, education, total household size, employment status, salaries and wages, child grant, crop cash and land size on crop production (maize and butternut) and livestock production (chicken and goat).

The general form of the regression model was considered as follows:

$$Y = f(x_1, x_2, x_3, \dots, x_n) \text{-----}(1)$$

Where:

Y is the dependent variable representing the physical outputs of maize and butternut produced by the farmers and the livestock numbers (chicken and goats), and

x_1, x_2, \dots, x_n stand for the various independent variables, such as the household, demographic and socio-economic characteristics, as well as production and marketing information (including prices, land area, etc).

The model is subsequently specified as:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 \dots \beta_n X_n + \mu_i \text{.....}(2)$$

Where:

β_0 = the intercept or constant term

$\beta_1, \beta_2, \dots, \beta_n$ = slope or regression coefficient

X_1, X_2, \dots, X_n = explanatory or independent variables

μ_i = error or disturbance term.

For purposes of this study, the X's were included in the model as:

X_1 = Gender

X_2 = Marital status

X_3 = Education

X_4 = Total household size

X_5 = Employment status

X_6 = Salaries and Wages

X_7 = Child grant

X_8 = Crop cash

X_9 = Land size

μ_i = error or disturbance term

Using the Statistical Package for Social Science (SPSS) computer software, beta values ($\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7$ and β_8) were obtained. These values measured how strongly each independent variable ($X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8$ or X_9) influences the dependent variable (Y). Thus, the higher the beta value the greater the impact of the independent variable on the dependent variable. In measuring livelihood strategies the above mentioned variables were chosen based on the work done by Kodua-Agyekum (2009) for the same area, and the multiple regression model was used to identify factors that influence livelihood strategies.

Table 4.1: Variables used in the multiple regression model for Crop production (maize and butternut)

| Variable name | Definition | Type of measurement | Prior expectations (+/-) |
|--|--|---|---------------------------------|
| <i>Dependent variable</i> | | | |
| Crop production (maize and butternut) | Farmer being in a position to produce maize and butternut. | Maize and Butternut (measured by weight in kilograms) | + |
| <i>Independent Variable</i> | | | |
| Age | Age of the household head in years | Actual age in years (continuous) | + |
| Gender | Whether a household member is male or female | Dummy employed: 1 = male, 0 otherwise | + |
| Marital status | Married, single, or widowed | Dummy employed = 1 0 otherwise | + |
| Size household | Actual number | Continuous | - |
| Employment status | Employed or not employed | Dummy employed =1, 0 otherwise | + |
| Educational level | Attendance of the formal school | Dummy employed = 1, 0 otherwise | + |
| Land size | Actual number of hectares used for crop production | Actual number of hectares (continuous) | + |
| Agricultural output | Output from agriculture in terms of weight (Kilograms) | Continuous | + |
| Income and Remittances | Income from relatives (measure in Rands) | Dummy Yes=1, 0 otherwise | + |
| Physical access to irrigation | Whether a farmer is on an irrigation scheme or not | Dummy yes=1, 0 otherwise | + |
| Village | Study area in Qamata | Dummy yes=1, 0 otherwise | +/- |

Table 4.2: Variables used in the multiple regression model for Livestock production (chicken and goats)

| Variable name | Definition | Type of measurement | Prior expectations (+/-) |
|--------------------------------------|---|---|---------------------------------|
| <i>Dependent variable</i> | | | |
| Livestock Production | Farmer being in a position to produce chicken and goats | Chicken and Goats measured by their actual number, (continuous variables) | + |
| <i>Independent Variable</i> | | | |
| Age | Age of the household head in years | Actual age in years (continuous) | + |
| Gender | Whether a household member is male or female | Dummy employed: 1 = males, 0 otherwise | + |
| Marital status | Married, single, or widowed | Dummy employed: 1 = if married, 0 otherwise | + |
| Size household | Actual number | Continuous | - |
| Employment status | Employed or not employed | Dummy employed =1, 0 otherwise | + |
| Educational level | Attendance of the formal school | Dummy employed: 1 = employed, 0 otherwise | + |
| Land size | Actual number of hectares used for crop production | Actual number of hectares (continuous) | + |
| Agricultural output | Output from agriculture in terms of number of animals | Continuous | + |
| Income and Remittances | Income from relatives (measure in Rands) | Dummy employed: 1= if receives remittances, 0 otherwise | + |
| Physical access to irrigation | Whether a farmer is on an irrigation scheme or not | Dummy yes=1, 0 otherwise | + |
| Village | Study area in Qamata | Dummy yes=1, 0 otherwise | +/- |

4.5.1 Variable specification

(i) Village: The village in this study is used to explain the geographical area in which the farmers are located and how the area is suitable for agricultural production. A dummy variable was used in the study to identify the villages in which these people live and to capture their differences in terms of agricultural production activities.

(ii) Maize production: Maize is the most important grain crop in South Africa and is produced throughout the country under diverse environments. According to du Plessis (2003) maize production depends on the correct application of production inputs that will sustain the environment as well as agricultural production. These inputs are, inter alia, adapted cultivars, plant population, soil tillage, fertilization, weed, insect and disease control, harvesting marketing and financial resources.

(iii) Age of the household- Age is a variable that play an important role in determining the engagement of the household members in agricultural activities. Hofferth (2003) mentioned that older household heads are expected to have better access to land than younger heads, because older farmers usually attain the land from their grandparents whilst younger farmers either have to wait for a land distribution, or work together with their families. Age of household head is a continuous variable and is measured in years.

(iv) Gender: Is a variable that determine whether you are male or female. According to (FAO, 1995) in rural areas females are more likely to participate in subsistence crop farming (agricultural production) as compared to males. This may suggest that males are more likely to migrate to the cities to search for jobs so to diversify sources of income. Women are left behind to take care of agricultural activities like crop production for survival as well as to attain food security for the household (Mathias *et al.* 1995).

(v) Marital status: .The that for ensuring Refers to the condition of being married or unmarried. This variable is treated as dummy variable where 1 represent married and 0 for otherwise. In most African households, the priorities and stability of the household are usually judged on the basis of marital status of the household head. It is expected to influence the perception of farmers since it is normally believed that married household heads tend to be more stable in farming activities than unmarried heads.

(vi) Size of the household: This means the number of family members residing in one household. In most rural areas agricultural production relies on labour provided by household members. Household with relatively more members are expected to have a positive relationship with farming activities and they are likely to produce more.

(vi) Educational level: This refers to the highest level of education attained by the household head. The respondent from each household may have obtained primary, junior, secondary or tertiary education. Most of the rural population is not highly educated which confirms the literature that suggests low literacy and lack of information among rural households heads result in most of them lacking information on how to improve their savings or investment in agriculture as well as on how to apply the new technologies in order to yield more from their produce. Education serves as an important tool in decision making. Education is important to farmers because it determines the ability of a farmer to adjust to new innovations.

(vii) Land size: This variable refers to the total arable land, in hectares, a household owns and uses for crop production such as maize and vegetables. Land size has the impact on the amount of the produce because the larger the land size, the higher the production level.

(viii) Employment status of household head: Employment is important for diversification of sources of farm households' livelihoods (FAO 1995). It enables households to modernize their production by giving them an opportunity to apply proper inputs and reduce the risk of food shortage during periods of drought. Diversification of income sources allows households to reduce the risk of chronic or transitory food insecurity (Devereux 1993).

(ix) Agricultural Output: Agricultural production consists of the crop output which includes harvested (maize and vegetables) by the farmers for each study area. It is assumed that agricultural production influences household food security through the price effect. That is, an increase in production causes price to fall hence those households whose income is dependent on food crops face a fall in farm income. The higher the market supply the lower the price and hence the higher the loss of production revenue in the case of inelastic demand (Foster 1992).

(x) Remittances: Households in rural areas receive cash transfers in the form of remittances from their relatives and friends in urban areas and as a result people in rural areas are less likely to participate subsistence crop farming.

(xi) Physical access to irrigation: Access to irrigation is expected to have a positive relationship with household food security (Burton *et al.* 2005). Farmers with plots on the irrigation schemes are able to grow crops throughout the year and meet household food requirements than those on dryland farming. A dummy variable is used. Those farmers on the irrigation schemes take the value of one and those not on the irrigation schemes take the value of zero. Thus, the expected effect on food security is positive for irrigation farmers.

4.6 Summary of the chapter

In this chapter, the methods used to analyze the data were reviewed. Data were collected from 70 smallholder farmers in the Qamata area. The research focused on both irrigation and non-irrigation farmers so as to compare strategies and opportunities that contribute to their livelihoods. Stratified random sampling was applied in order to select a sample from smallholder farmers involved in agricultural production with the main activities being maize/butternut, chicken and goats enterprises. Data analysis was by means of the Multiple Regression model to assess these strategies and the opportunities in smallholder farming. The results of the research follow in the next two chapters.

CHAPTER 5

RESULTS AND DISCUSSION OF THE DESCRIPTIVE ANALYSIS

5.1 Introduction

A broad objective for this study is to assess livelihood strategies and opportunities with regard to farming in Intsika Yethu Local Municipality. The chapter follows the specific objectives of the study. The objectives include identifying the existing livelihood strategies in Intsika Yethu Local Municipality, to identify the availability of livelihood outcomes in Intsika Yethu local Municipality, to assess the impact of farmers' socioeconomic factors affecting major livelihoods more specifically, the Qamata Irrigation Scheme. This chapter presents the results and discussion of the descriptive analysis. The data under analysis was collected from 70 households in the Eastern Cape. It focuses mainly on the key findings that are important in the understanding of rural livelihoods. The co-operative members (70) from Qamata were interviewed. Out of all the 70 farmers that were interviewed, the members to irrigation scheme were 53 and 17 were non-members to the scheme. The first section begins with brief explanations of the demographic characteristics of the households. Within the chapter, descriptive statistics such as mean values, frequencies, percentages, pie charts and bar graphs were used. An overview of the livelihood strategies obtained from households in Qamata village is presented.

5.2 Household Demographics

The characteristics of the sampled households were analyzed by means of descriptive statistics. In this section, aspects such as gender, age, household size and highest education levels are discussed. These aspects are important because the main household activities are coordinated by the household head and the head's decisions are most likely to be influenced by such demographic aspects (Bembridge, 1988). Demographic characteristics of households are essential when analyzing economic data because such factors influence the households' economic behavior. These characteristics are important in influencing a household's livelihood strategies (Matlosa, 1993; Pirouz, 2005; Nargis & Hossain, 2006).

5.2.1 Gender distribution

Table 5.1 summarizes the gender distribution of the interviewed smallholder farmers in Qamata village. For members the irrigation scheme, there was a fair distribution of interviewed males and females, females accounted for about (50.9%) and males (49.1%). Unlike at non-members to irrigation scheme had females (64.7%) than males (35.3%). This can be attributed to the fact that most households are headed by women; therefore they are the most likely respondents.

Table 5.1: Gender of Households Head

| Factor/Variable | Members to irrigation scheme | | Non-members to irrigation scheme | | Total | |
|------------------------|-------------------------------------|----------|---|----------|--------------|----------|
| | No. | % | No. | % | No. | % |
| Male | 26 | 49.1 | 6 | 35.3 | 32 | 45 |
| Female | 27 | 50.9 | 11 | 64.7 | 38 | 55 |
| Total | 53 | 100 | 17 | 100 | 70 | 100 |

Source: Field Survey, 2012

According to Mihiretu (2008) both males and females are likely to play different roles in technology adoption and use, depending on the nature of the technology. The household head has a significant influence in the decision making concerning the allocation of resources to improve household welfare (Matlosa, 1993). Hebinck & Lent (2007) posit that women make up the core of rural household decision making, rural income generating activities and are the principal providers while men have freedom of mobility and participation in different extension programs. Besides, several efforts have been made both in South Africa and elsewhere to address gender inequality with special reference to income generation and promotion of rural livelihoods (Susie, 2004). Muller (2005) listed gender as one of the crucial issues to consider in rural development in sub-Saharan Africa and developed a conceptual framework for analyzing gender-specific constraint, in relation to productive and reproductive roles and their effects on rural livelihoods.

Table 5.1 shows that when the members and non-member are combine together as one group, heads are slightly to be dominant.

5.2.2 Age of Head of Household

According to Hofferth (2003), the age of a household head is a vital aspect in agricultural production and productivity as it determines farming experience. Muller (2005) has suggested that age has important implications on livelihood experience. Livelihood strategies change as the head of household advances in age. Furthermore, the age of a household head determines the knowledge of the social and physical environments. For these reasons, this study examined the age of the household head to determine the distribution of the sample by age of the household head as well as determine the extent to which age differences explain differences in production and productivity among the farmers. The distribution of the sample by age of the household head is presented in Table 5.2.

Table 5.2: Household head age distribution

| Factor/Variable | Both Members and Non-members to irrigation scheme | |
|-----------------|---|------|
| | No. | % |
| Age range | | |
| 30-50 | 11 | 15.7 |
| 51-70 | 48 | 68.6 |
| 71-90 | 11 | 15.7 |
| Total | 70 | 100 |

Source: Field Survey, 2012

From the indication in Table 5.2, farming in the study area seems to be performed mostly by relatively older people. This is probably because young people are not interested in agriculture or they migrate to urban areas in pursuit of other forms of employment, which may offer better income compared to farming. Dereje (2006) suggested that as a farmer's age increases s/he becomes more conservative. Therefore, as the farmer's age increases, the probability of adopting new technology decreases. However, Hofferth (2003) argues that older people can be more adaptive to new technologies because they have relatively richer experiences of the social and physical environments as well as greater experience of farming activities.

5.2.3 Household size

Household size in this study was considered as the number of individuals who reside in the respondent's household. Cherdchuchai & Otsuka (2006) found that the household size, number

of household members and working members, captures the quantity of human capital. Household size has important practical implications for labour availability which acts as the basis for a household to decide whether or not to participate in different activities. Perret *et al.* (2000) in their studies results recorded that an average of 5.9 persons per households in the Eastern Cape ranges from 4.8 to 5.2 and this was said to be significant higher than the provincial average of 4.3 members. In rural areas, labour substitutes for machinery and most rural income generating activities depend heavily on family labour because of limited finance to buy or hire machinery.

Referring to the results of this study, Figure 5.1 presents the distribution of the sample according to the household sizes of the sampled farmers. The data revealed that the average household size in Qamata for members of the irrigation scheme was 5.98 and for non-members was 5.06. These figures are quite reasonable when compared to the national averages observed by Pirouz (2005) between 1995 and 2002 in South Africa and those reported by Perret *et al.* (2000).

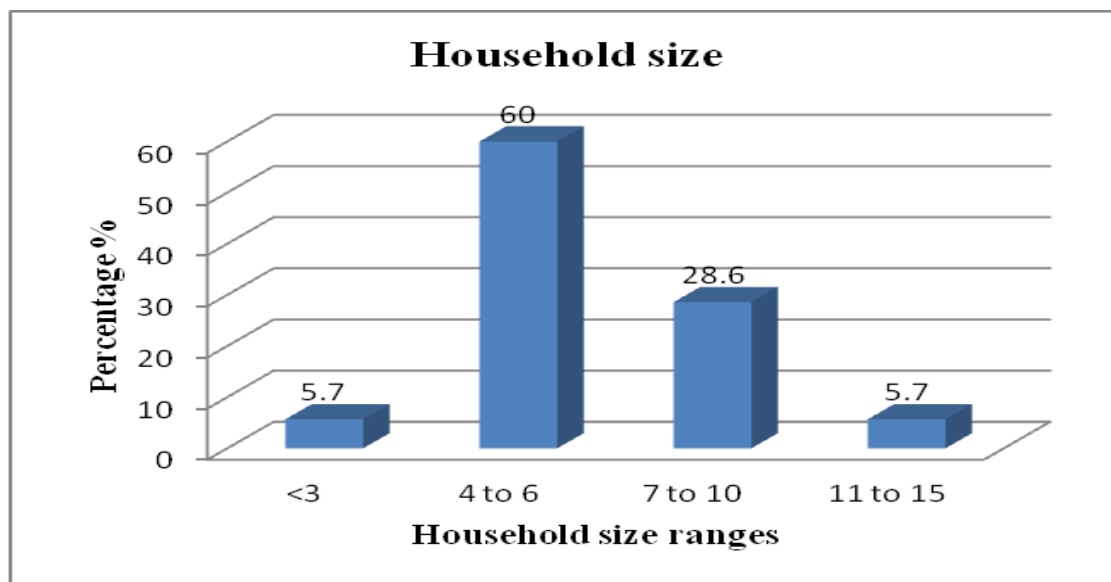


Figure 5.1: Household size (n=70)
Source: Field Data 2012

5.2.4 Marital Status of Household Heads

Marital status influences livelihood strategies practiced by rural households especially to the extent that it has implications for migratory behavior. In their studies in Kenya, Ethiopia and Uganda, Matsumoto *et al.* (2006) found that single women are more mobile than married women. According to the results presented in Figure 5.2, most respondents were married (64.3%), 20% were divorced, and 15.7% were single.

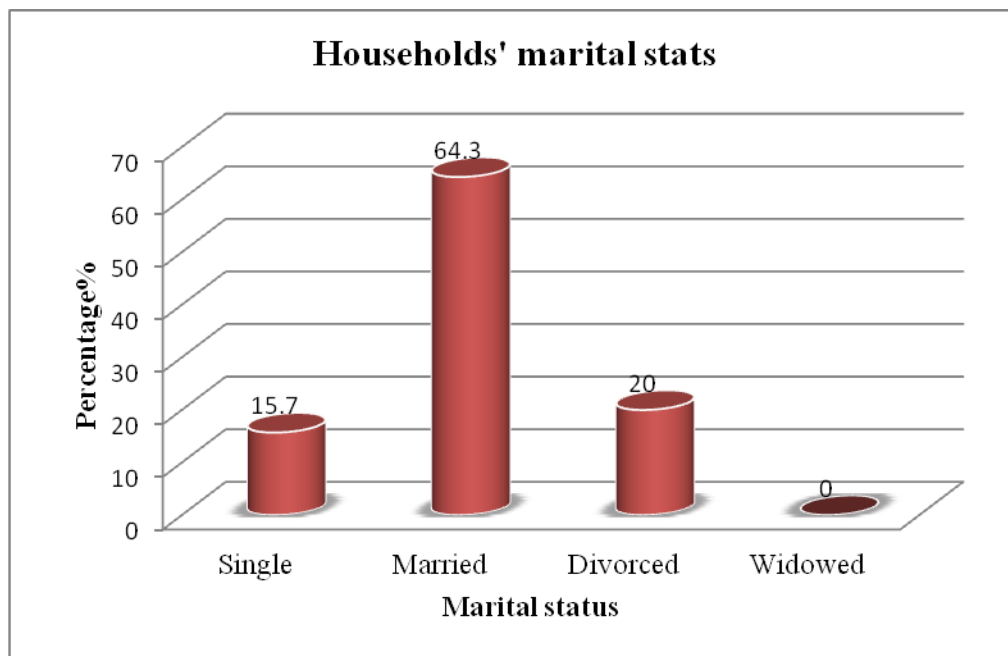


Figure 5.2: Marital status of the household heads (n=70)

5.2.5 Household's level of education

Literacy has been noted to be one of the factors enabling farmers to acquire and process relevant information effectively. Education has the possibility of influencing household's livelihoods strategies and also determines the income derived from the activities undertaken by the household. Yunez-Naude & Taylor (2001) suggest that education is crucial to raising economic productivity and competitiveness and to combating poverty. This study collected information on the level of education attained by the household head who is the central decision maker in the household and the results are presented in Table 5.3.

Table 5.3: Household's level of education

| Factor/Variable | Both members and non-members to irrigation scheme | |
|------------------------|--|----------|
| | No. | % |
| Education level | | |
| No Education | 15 | 21.4 |
| Primary | 35 | 50 |
| Secondary | 20 | 28.6 |
| Tertiary | 0 | 0 |
| Total | 70 | 100 |

Source: Field Survey, 2012

The attainment of education in Qamata village appeared to be quite reasonable. Combined data for members and non-members of irrigation scheme (Table 5.3) revealed that 50% of household heads had primary education, 28.6% completed secondary education and on the other hand 21.4 percent had no education and not a single respondent from the village had tertiary education. Generally the majority of the respondents had attained some formal education.

5.2.6 Employment status of Qamata households

According to Statistics South African census results, Eastern Cape Province was reported to have the second highest rate of unemployment (of 51.2%) in the country (Eastern Cape Socio Economic Consultative Council (ECSECC), (2012). In most cases unemployment rate is linked to high poverty levels. According to Kodua-Agyekum (2009), employment opportunities in the formal sector at Qamata are very limited. The results in relation to this study are presented in Table 5.4.

Table 5.4: Employment status

| Factor/Variable | Both members and non-members to irrigation scheme | |
|--------------------------|--|----------|
| | No. | % |
| Employment Status | | |
| N.O.E.M | 20 | 29 |
| N.O.U.M | 50 | 71 |
| Total | 70 | 100 |

N.O.E.M-Number of employed members; N.O.U.M-Number of unemployed members

Source: Field Survey, 2012

Table 5.4 indicates that most households in Qamata are unemployed (71%) and only 29% employed. The unemployed may be depending on social grants, remittances and crop incomes as their source of livelihood. Also the high unemployment rate may be due to lack of industries, low rates of urbanization and the service sector and thus resulting in less job opportunities. Figure 5.3 presents the same results pictorially.

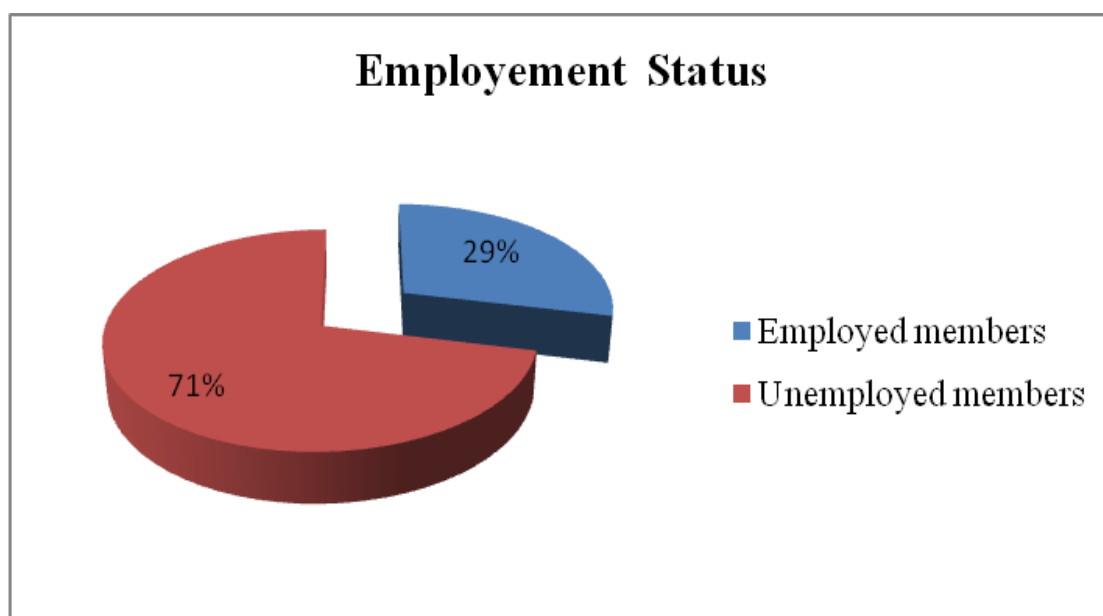


Figure 5.3: Employment status (n=70)

5.2.7 Household Income for Qamata households

Household income and expenditure has an important influence on family food security, acquisition of basic needs and livelihood assets (Bembridge, 1987). Rural household income is one of the most important indicators of socio-economic status. In 2010 the average household income in the Eastern Cape was just less than R65,862 annually in real terms (ECSECC, 2012).

Table 5.5: Monthly Household Incomes

| Factor/Variable | Both members and non-members to irrigation scheme | |
|------------------------|--|----------|
| | No. | % |
| <700 | 1 | 1.4 |
| 701-1500 | 5 | 7.1 |
| 1501-2300 | 34 | 48.6 |
| 2301-3100 | 13 | 18.6 |
| 3101-3900 | 8 | 11.4 |
| 3901-4700 | 8 | 11.4 |
| >4701 | 1 | 1.4 |
| Total | 70 | 100 |

Source: Field Survey, 2012

Table 5.5 indicates that 48.6% of households in Qamata earn monthly incomes between R1501 and R2300, 18.6% of the households earn incomes ranging from R2301 to R3100 and 11.4% of household earn between R3101 and R3900. Further, 11.4% of households earn monthly incomes ranging from R3901 to R4700 and 1.4% of households earn more than R4701, and 8.5% (1.4% +7.1%) of households earn monthly incomes that range between R700 to R1500.

5.2.8 Land sizes and distribution by study area

Total farmers' land holding may serve as a convenient proxy for wealth, status and income levels (Bonabana-Wabbi, 2002). Having more land is likely to have a positive effect on adoption of improved practices. According to Aina (2007), smallholder farmers in the Eastern Cape Province have land of about 0.5ha to 4ha producing food for household consumption and little for the market.

Table 5.6: Land sizes and distribution by study area

| Factor/Variable | Both members and non-members to irrigation scheme | |
|-----------------|---|------------|
| | No. | % |
| <1 | 39 | 55.7 |
| 1-2 | 19 | 27.1 |
| 2.1-3 | 9 | 12.9 |
| >3 | 3 | 4.3 |
| Total | 70 | 100 |

Source: Field Survey, 2012

5.3 Source of income

The study examined the sources of household incomes in the study area. Given the importance of social grants both nationally and at the provincial level, the study specifically sought to determine the proportion of the respondents who were recipients of social grants. Disability Grants were specifically investigated and the results are presented in Figure 5.4.

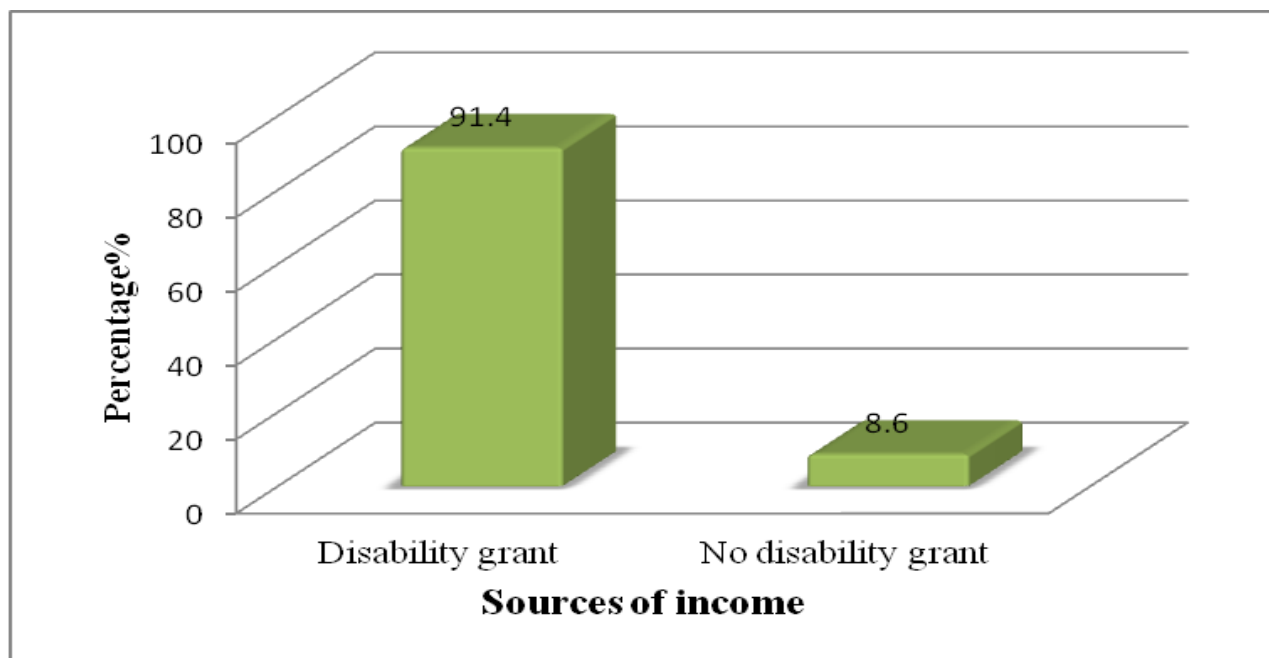


Figure 5.4: Sources of income (Disability grant)

Source: Field Data, 2012

From the Figure 5.4, it is evident that most households were receiving disability grants. According to the results, about 91.4% of the respondents were receiving disability grants during the survey period and only 8.6% were not receiving any disability grants. The response from interviewed households' heads was that there is nothing to claim for when you have been working as informal labour.

Figure 5.5 shows the proportion of households receiving child grants in Qamata. About 49% of the households receive child grants while the rest do not receive child grants. The major income source is the government social grants as these are used to smoothen household consumption which includes household food security. The social assistance grants dominated probably due to various factors such as high unemployment rate and low levels of education.



Figure 5.5: Source of income (Child grant)

Source: Field Data, 2012

Old age pension is another type of grant these household receive in communal areas. The distribution of households according to whether or not this form of social grant is received is shown in Figure 5.6. The results suggest that the same scenario exists in Qamata for old age

pension as elsewhere in the province with 57% of households relying on old age pension grants in spite of them being involved in agriculture. These findings are consistent with the data provided by the IDP (2007) which showed that more than half the households in various communities under Qamata are heavily dependent on government social grants, with an estimated 7 000 beneficiaries claiming either an old age pension, disability grant, foster care grant or a child grant.

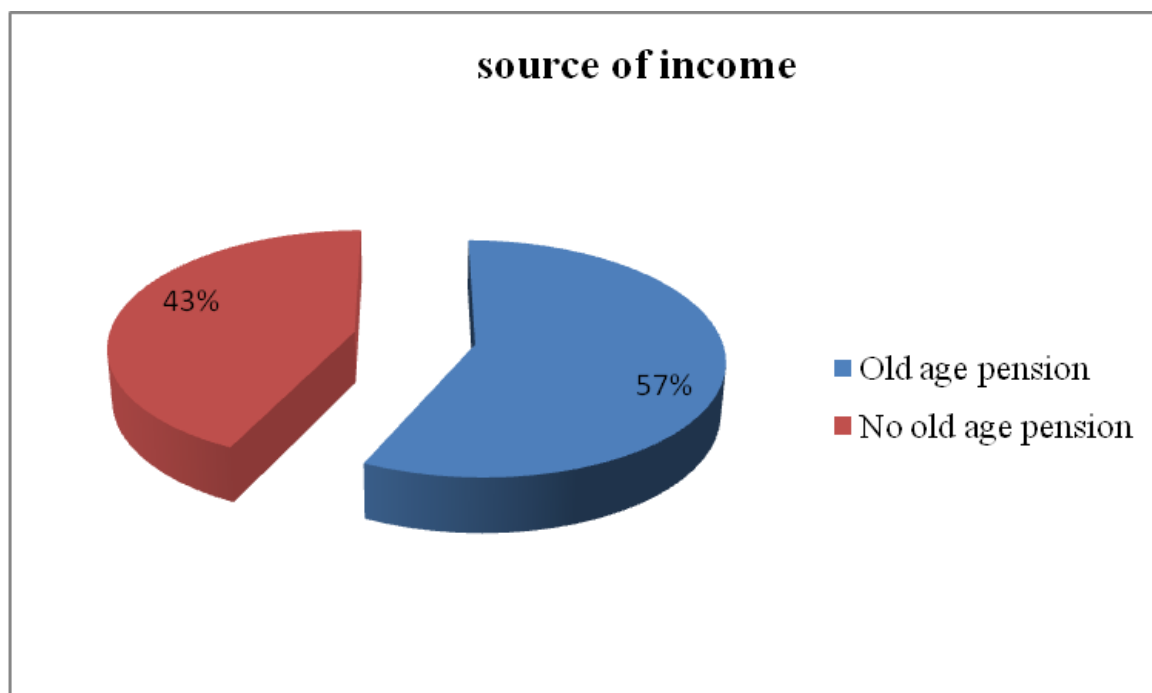


Figure 5.6: Source of income (Old age pension)
Source: Field Data, 2012

As illustrated in Figure 5.7, other sources of income include crop and non-crop incomes. Households who only depend on agricultural production income as the other main source of income comprise about 93% and the rest are likely not from agricultural production. The reason is that most of the households have home garden and therefore they produce for home consumption and to exchange with their relatives. A small fraction of the respondents produce to sell but they do not consider that as the main source of income because it is insignificant, they would rather use it with other sources of income. Apart from social grants and farm incomes some rural households rely on remittances and salaries which contribute significantly to household food security and some of the farmers invest in agriculture from these incomes.

Income received can change how people behave and how they live their lives, and their preferences and consumption patterns change. The amount of money a household has determines the quantity of food a household should have. Individuals have sufficient access to food when they have adequate incomes or other resources to purchase food (Ziervogel *et al.* 2006).

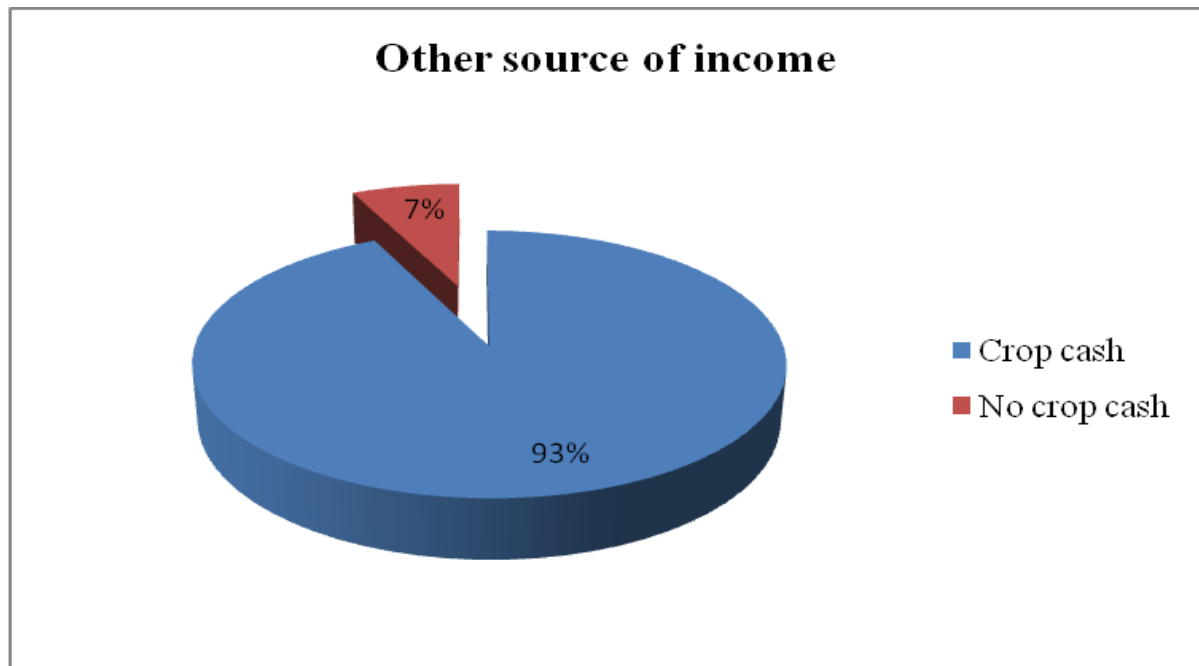


Figure 5.7: Other source of income (Crop cash)
Source: Field Data, 2012

From these respondents for some their preferences have changed for the best meaning they are now able to buy food and meet household demands and are they likely to invest in agriculture, specifically cropping and also invest in other social services such as health and education.

5.4 Summary of the chapter

The results presented in this chapter show a fair distribution of gender in Qamata and smallholder farmers have different enterprises that contribute to their livelihoods. Males are more dominant than females and as a result household decisions are skewed in favor of men. However, it has been shown that males and females practice different farming types, with males

mainly being cattle farmers, and females as vegetable farmers. There are both young and old smallholder farmers, where many older farmers (usually pensioners) are in cattle farming and young farmers are into vegetables and cereals. The section on household size and dependency values pointed out that the families are generally large for both vegetable and cattle farmers, which in turn influence the strategies and opportunities that these farmers adopt to enhance their livelihoods.

CHAPTER 6

RESULTS OF THE INFERENTIAL ANALYSIS

6.1 Introduction

The main aim of this chapter is to present the results of the inferential analysis carried out on the data. As has been described in chapter 4, the analysis involved the fitting of a multiple regression model in order to determine the factors influencing variations in a range of principal enterprises identified in the farming system. In this regard, the study examined the performance of the farmers in respect to two main crops, namely maize and butternut, and two main livestock enterprises, namely chicken and goat production. These two enterprises were chosen for this study because they were the most popular activities or rural livelihood strategies practiced by people living in Qamata. The results are presented separately for each enterprise. Subsequently, a whole farm analysis is carried out by aggregating the data for all enterprises and groups enumerated.

6.2 Factors affecting maize production

Multiple regression analyses were conducted to assess rural households' livelihoods strategies and opportunities with regard to farming in Qamata irrigation scheme. The variables that were used in the model include gender, marital status, education, total household size, employment status, salaries and wages, disability grant, child grant, crop cash and land size. These variables were used independently to assess their impact on crop production such as maize and butternut production. In this regard, the dependent variables measured were maize and butternut production. The quantity of maize and butternut was measured in kilograms and used as the dependent variable for the crop components. There were also two other dependent variables measured namely, chicken and goat production. The livestock numbers owned were used as measure of the production of the chicken and goats. Independent variables used were gender, marital status, education, total household size, employment status, salaries and wages. Using the multiple regression model the beta values ($\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7, \beta_8$ and β_9) were obtained as these measure how strongly each independent variable ($X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8$ and X_9) influences the dependent variable (Y). Based on the results in Table 6.1, some of the variables had a positive and significant impact on maize production while marital status had a negative and

significant impact on maize production in Qamata area. According to the inferential results marital status had a negative coefficient meaning that household is either married or single have a significant impact on maize production in rural areas. The result is interesting because one would expect a positive sign which could mean that married people tend to make better decisions compared to single or divorced households. Maize and butternut production were measured in weight using kilograms and under livestock production such as chicken and goat production were measured in numbers since they were continuous variables.

Table 6. 1: Factors influencing the maize production

| Variables | Both members and non-members to irrigation scheme | |
|----------------------|---|----------|
| | β | Sig. |
| Constant | -529.632 | 0.455 |
| Gender | 127.413 | 0.596 |
| Marital status | -367.894 | 0.079* |
| Education | 384.230 | 0.036** |
| Total household size | 107.277 | 0.027** |
| Employment status | -471.899 | 0.424 |
| Salaries & wages | -569.228 | 0.330 |
| Child grant | -264.788 | 0.249 |
| Land size | 888.448 | 0.000*** |

*** Statistically significant at 1% significance level **statistically significant at 5% significance level *statistically significant at 10% significance level $R = 0.700$, $R^2 = 0.490$, Adjusted $R^2 = 0.423$

Another variable that was found to be significant is educational status of the respondents. Educational level was significant at 5% and had positive coefficient meaning that as people attains more education they produced better yields on their farms. The more educated the individual had the better the agricultural output. The result agrees with Najafi (2003) that as a household head attains better or higher education she or he becomes more aware of the possible advantages of modernizing agriculture by means of adoption of improved technologies, enabling them to read instructions on fertilizer packs and diversification of household income which, in turn, would enhance their crop production. Among other things, an educated farmer is said to usually find it much easier to understand and interpret market information correctly; network and

communicate their business ideas, have better general farm management principles and marketing skills and develop financial intelligence.

Household size was found to be significant at 5% and positively related to the dependent variable. Household size in rural areas determines the labor supply that could be used in agriculture. The result in Table 6.1 shows that household size plays an important role in these communities and more members a household has the more likely it is to produce more maize in Qamata area. Irrigation farming is an intensive form of farming and thus a lot of labour is required for agricultural activities to increase maize production. Also larger families have more responsibilities. It is also possible that they have greater access to resources for investment and therefore they are able to procure inputs to apply improved production practices.

Land size is the amount of land owned by the farmers in communal areas. The larger the land cultivated the higher the production level. It is expected that households with large farms produce more maize compared to those who farm on small pieces of land. In this case there are farmers who are operating on irrigation schemes that produce better yields and also farmers on dry land are likely to require more land to increase their production. Land size was significant at 1% and positively related to maize production.

6.3 Factors influencing the production of butternut

Agricultural production in communal areas is usually centred on women as men often migrate to urban areas to seek employment. Women play a critical role in agricultural production, and especially in subsistence agriculture, as well as in livestock keeping and food processing (FAO 1995). Women concentrate on the production of food crops to attain household food security and men's income can be used on other activities. The results in Table 6.1 show that men play an important role in agriculture as shown by the positive coefficient (5% significance level of gender). The result shows that household with male headed members produce more butternut than female headed households.

Education was found to be significant at 5% and positively related to butternut production. Households led by educated heads tend to perform better in agricultural activities as compared to household with uneducated members. The results show that education plays an important role in butternut production.

Table 6. 2: Factors influencing the production of butternut

| Variables | Both members and non-members of irrigation scheme | |
|----------------------|---|----------|
| | β | Sig. |
| Constant | -133.211 | 0.285 |
| Gender | 86.086 | 0.044** |
| Marital status | -97.344 | 0.009*** |
| Education | 78.019 | 0.016** |
| Total household size | 15.079 | 0.074* |
| Employment status | 74.819 | 0.470 |
| Salaries & wages | -166.833 | 0.106 |
| Child grant | -47.030 | 0.243 |
| Land size | 29.195 | 0.216 |

*** Statistically significant at 1% significance level **statistically significant at 5% significance level *statistically significant at 10% significance level $R = 0.460$, $R^2 = 0.212$, Adjusted $R^2 = 0.109$

Just like in Table 6.1, marital status was found to be significant. In this case it was significant at 1% significance level and positively related to butternut production. Total household size had a positive coefficient (15.079) and was significant at 10% showing how important household size is to agricultural production in rural areas. Butternut production requires a lot of labour during the harvesting season as it requires be packed into proper bags and selling to markets. The other variables such as employment status, salaries and wages, child grand and land size were found to be insignificant.

6.4 Factors influencing the production of Poultry

When assessing the different variables between irrigation and non-irrigation members on poultry production, only one variable was found to be significant at 10% and negatively related to chicken production. Gender of household head was negatively related to poultry production meaning that women are more likely to produce large numbers of chickens than men. Poultry production in the informal sector requires a lot of care which women probably are better able to give than men.

Table 6.3: Factors influencing the production of Chicken

| Variables | Both members and non-members of irrigation scheme | |
|----------------------|---|--------|
| | β | Sig. |
| Constant | 23.183 | 0.010 |
| Gender | -5.029 | 0.089* |
| Marital status | -0.137 | 0.955 |
| Education | -1.314 | 0.551 |
| Total household size | -0.433 | 0.442 |
| Employment status | -0.49 | 0.995 |
| Salaries & wages | -3.110 | 0.659 |

*** Statistically significant at 1% significance level **statistically significant at 5% significance level *statistically significant at 10% significance level $R = 0.277$, $R^2 = 0.076$, Adjusted $R^2 = -0.011$

The rest of the variables which include marital status, education level, total household size, employment status and salaries and wages were found to be insignificant to poultry production in this case.

6.5 Factors influencing the production of goats

Among all the variables that were investigated to affect goat production in this study, gender and total household size came out to be the only significant variable all at 5% significance level respectively. The results are shown in Table 5.14 which shows that females are actively involved in rearing of goats than males. Household size also has an influence on goat management and production.

Table 6.4: Factors influencing the production of goats

| Variables | Both members and non-members to irrigation scheme | |
|----------------------|---|---------|
| | β | Sig. |
| Constant | -0.752 | 0.922 |
| Gender | -6.421 | 0.015* |
| Marital status | 3.841 | 0.078 |
| Education | 1.883 | 0.334 |
| Total household size | 1.167 | 0.021** |
| Employment status | -9.078 | 0.159 |
| Salaries & wages | 3.834 | 0.539 |

*** Statistically significant at 1% significance level **statistically significant at 5% significance level *statistically significant at 10% significance level $R = 0.471$, $R^2 = 0.222$, Adjusted $R^2 = 0.148$

Goats serve as a source of quick income in rural areas of South Africa, thereby significantly affecting households' food security. Goats are normally used for traditional celebrations in the Xhosa culture and can be readily sold to neighbors and friends around the villages.

In all cases, the R^2 was examined to assess the goodness of fit of model. In regression, the R^2 or coefficient of determination is a statistical measure of how well the regression line approximates the real data points. It is defined as the ratio of the sum of squares explained by a regression model and the total sum of squares around the mean (Henry, 2001). The R^2 was found to be 0.490, 0.212, 0.076 and 0.222 for maize, butternut, chicken and goat production respectively. These results imply that the models did not explain a large part of the variations in the dependent variable, except in the case of maize where nearly half of the variations were explained by the model. Other models will be investigated at a later stage to see if they provide a better prediction of the variations.

6.6 Summary of the chapter

The results from this chapter show that smallholder farmers have many strategies that they adopt to increase their incomes. Most of these farmers grow crops and keep livestock to meet their household food security needs in these communities. From the results in this chapter variables that were found to play a significant role in contributing to household food security for the

various enterprises were gender, size of household size, education and marital status. Thus it can be concluded that for smallholder farmers to be effective in their production activities, they need to have bigger family sizes. Empowerment of women is also likely to contribute positively to food security.

CHAPTER 7

SUMMARY, CONCLUSION AND RECOMMENDATIONS

7.1 Introduction

This chapter draws a summary of the research findings and conclusions based on the results of the study and recommendations put forward on rural households' livelihoods strategies and opportunities with regard to farming in Qamata. The primary objective of the thesis was to assess the livelihood strategies and opportunities with regard to farming in Qamata. For the investigation of livelihoods strategies employed and opportunities obtained by rural households who live in Qamata, a total of 70 sampled households were interviewed using structured interviews. The analysis was done with the help of descriptive and multiple regression models employing SPSS computer software. The multiple regression models were employed to analyze the factors determining or influencing the maize, butternut, chicken and goat production.

7.2 Summary

The main body of the dissertation is divided into six chapters which cover the introduction, literature review, description of the study area, the methodology, results and discussion of descriptive statistics as well as the results of the inferential analysis.

Agriculture is the backbone to the economic growth, especially to rural people who use different livelihood strategies for their survival. The agricultural production in rural areas is characterized by few products finding their way to markets. This means that the majority of rural households are producing for home consumption rather than selling to the market. Due to widespread and persistent poverty and underdeveloped agriculture in rural areas, rural households tend not to realize the full potential of agriculture. As a result they tend to rely heavily on other livelihood strategies which include income from claims against the state and on money remitted by members of the family that work elsewhere, usually in urban environments. Rural areas are characterized by high rates of unemployment, poverty, deprivation and malnutrition with all their attendant consequences (Kodua-Agyekum, 2009).

7.2.1 The review of the literature

The review of the literature is presented in chapter two of the dissertation. This part played a major role as it directed through towards the elements to focus on in the study. The clear understanding of the livelihoods concept and vulnerabilities are emphasized. The literature reviews the role of technology and the small- scale irrigation technology.

An idea of the means of living which refers to the way people make living defines the livelihood concept.. Making a living is largely concerned with income generation. However, it also entails food security, ability to control one's own destiny (power), health and sustainability. Due to the coherent and interrelatedness of the set of activities that are implemented within a broader environment, the concept of livelihood is often considered in the form of 'livelihood systems'. Analysing the livelihood systems refers to the analysis of the factors or elements involved in the issue under consideration.

Irrigation is one technology that is adopted by small-scale farmers in Qamata irrigation schemes. Non-irrigation farmers are probably in the best position to adapt technology to their requirements and circumstances. Many irrigation farmers "learned their trade" working for large commercial farmers. Non-irrigation farmers survive because they have access to government social grants.

7.2.2 Description of the study area

The study was carried in the Eastern Cape province of South Africa, specifically in Qamata. The study area, Qamata, is situated in the Eastern Cape province of South Africa. The Qamata area is located in the southwest of the former Transkei now part of the Intsika Yethu Local Municipality whose administrative headquarters is at Cofimvaba.

7.2.3 The methodology

The structured questionnaires in the form of a survey were used as a method of data collection. The units of analysis identified were rural households of Qamata village and about 70 households' head sample was interviewed. The Multiple Regression model was used to test the livelihood strategies adopted by smallholder farmer in improving household food security and welfare in Qamata area.

7.2.4 Results and discussion of the descriptive statistics

The findings have established that households for both groups of producers are headed by females. This implies that farmers that are under irrigation farming or dry land farming should consider gender balance in Qamata so that farmers can share responsibilities. Family size is relatively high especially for irrigation farmers as compared to dry land farming which is used to increase labour supply.

Qamata farmers have very small land sizes (between 0 and 1 ha) for irrigation farmers. They operate below the recommended farm size threshold below which any form of agricultural production is not viable. The non-irrigation farmers are operating on between 1 and 2 ha of land. This means that if they are efficient enough they could be viable.

Both groups of farmers operate far below the potential production levels. If non-irrigation farmers who rely on rains can be excluded, the findings will depict the low production levels for them. This means that a lot has to be done for and by these farmers to improve their production efficiencies so that they can attain the potential levels of production for all the crops and livestock they produce.

As far as household income is concerned non-agriculture incomes has proved to be the mainstay of smallholder farmers in Qamata area. The reason being that most of these families are dependent on grants for their survival and very few farmers depend on agriculture. Thus, irrigation support can be another factor that can be considered to improve incomes for rural households and reduce rural poverty.

Farmers have resorted to growing vegetables and keeping small livestock to address poverty in rural areas and most of the farmers are into vegetable production. That is why these farmers have concentrated in crops that a better paying than no paying crops.

7.2.5 Results of the inferential analysis

A number of variables were considered in this study to assess the impact of different variables on production of butternut, goats, maize and poultry (Chicken) in Qamata. The study showed that household size is crucial in crop production, followed by gender in which females play an important role in agriculture.

Most of the variables that were found to be significant were household size, gender, marital status and education level. The significance of these variables tells a lot about these communities and how they affect agricultural production in rural areas.

Agriculture is important to community development as it promotes household food security and employment in rural areas. The results in Chapter six show that most people in Qamata are educated and grow a number of crops to spread their risk and survival strategies. The farmers are risk averse and try to strike a balance amongst the available opportunities in these rural areas.

7.3 Conclusion

Crop and livestock enterprises were selected for this study since they were identified to be the most reliable rural livelihoods strategies for Qamata people and they are likely to improve productivity and household income in rural areas contributes to the better welfare and reduces household food insecurity. Livelihoods strategies enhance agricultural productivity including those identified by both irrigation farmers and non-irrigation farmers in increasing household's income. Irrigation farming can be one way of solving the productivity in rural areas and there is abundant water to irrigate the crops throughout the year. The water can also be used for projects such as poultry (chicken) and goat production. Through irrigation farming the problem of food insecurity can be addressed since households can participate in production of cash crops in order to supplement their household's food basket. But this can only happen if irrigation can be taken as a strategy to help with the food insecurity problem amongst rural and urban inhabitants.

There are opportunities as well as benefits that are attained from engaging in this activity such as employment creation, reduction of household expenditure on food, income generation and recreation that results from the adoption or focus on the crop and livestock enterprise. There are constraints that prohibit rural households from taking part in home irrigation farming such as lack of land, machinery and support services from both government and private sector, of which some people in Qamata have access in the irrigation scheme. For rural households to exploit the opportunities in rural areas, the government, municipalities, households, non-governmental organizations and private sector need to take a leading role in providing farmers with technical support to increase their yields.

7.4 Recommendations

Households of Qamata have a great potential in maize and butternut production as well as farming chicken and goat. They are faced with different challenges as the results revealed that given all the assistance they need, they could produce more and this may results to improve the standard of living. There is a need for government to improve service delivery in terms of infrastructure, monitoring and evaluation of the irrigation schemes. There is a need for a strong extension support and advises to help people on how to diversify their production, provide market information thereby enhancing production and opening channels to the market. This may enhance rural households' livelihood outcomes from agricultural production thereby alleviating poverty and thus improve the food security in the Eastern Cape rural areas. The standard of education needs to be improved. This may have a result even on reducing the household size.

The government and research institutes need to come up with workshops and extension programmes to train people about producing good crop and livestock products. Irrigation farming can benefit smallholder farmers but is also important that farmers are engaged other non agricultural activities to improve their welfare.

There is also need of external support from both private and non-governmental organizations to support smallholder farmers. The government and farmers support organizations can also provide better infrastructure to these people. The government should introduce programmes like Massive food projects, Siyanzondla, Siyakhula and other related agricultural support services in rural areas of South Africa.

Mentorship programmes should also be encouraged so that smallholder farmers can work closely with commercial farmers. They will enable smallholder farmers to have access to the new technologies and managerial skills of running their farms. Thereby, promoting smallholder farmers to profitable markets to improve their incomes.

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APPENDIX



University of Fort Hare
Together in Excellence

Questionnaire

University of Fort Hare

Department of Agricultural Economics and Extension

Household survey questionnaire for Intsika Yethu Village

GENERAL INFORMATION

Enumerator's name.....

Questionnaire reference number.....

Date of the interview.....

DEMOGRAPHIC INFORMATION STARTING WITH HOUSEHOLD HEAD

Question1. Fill in the relevant information and where possible mark with an X.

| Q1.1 Age | Q1.2 Gender | | Q1.3 Marital status | | | | Q1.4 Education | | | | |
|-------------|----------------|------|------------------------|------|------|------|-------------------|------|------|------|------|
| | 1. M | 2. F | 1. S | 2. M | 3. W | 4. D | 1. N | 2. P | 3. S | 4. T | 5. O |
| | | | | | | | | | | | |

Gender: 1.Male, 2.Female; Marital status: 1.Single, 2.Married, 3.Widowed, 4.Divorced Education: 1.No education, 2.Primary, 3.Secondary, 4.Tertiary, 5.Other

| | |
|--|--|
| Q1.5 Number of adults (Age \geq 21) | |
| Q1.6 Number of children (Age \leq 20) | |

| | |
|--|--|
| Q1.7 Number of individuals bringing in income | |
|--|--|

Mark with an X

| Q1.8 Employment status of the household head | | | Q1.9 | | | | | |
|---|-----------|----------|--------------------------------|----------|-----------|-----------|-----------|----------|
| | | | Income class in R/month | | | | | |
| | | | <700 | 700-1500 | 1501-2300 | 2301-3100 | 3101-3900 | >3900 |
| 1 Unemployed | | 1 | 1 | 2 | 3 | 4 | 5 | 6 |
| 2 Formally employed | Full time | 1 | | | | | | |
| | Part time | 2 | | | | | | |
| 3 Informally employed | Full time | 1 | | | | | | |
| | Part time | 2 | | | | | | |
| 4 Pensioner | | 4 | | | | | | |
| 5 Other (Specify) | | 5 | | | | | | |

Question 2. Livelihoods

Q2.1 What are the external sources of income for household members? Indicate the number of individuals deriving income from each source

| Source | Number of individuals who depend this source |
|---|--|
| 1 Remittances (Cash) | |
| 2 Remittances (Kind) | |
| 3 Child support from parent outside household | |
| 4 Salaries & Wages | |
| 5 Old age pension | |
| 6 Disability grant | |
| 7 Child support grant | |
| 8 Other government grants, specify | |

Question 2.2 What are the local sources of income? Indicate the number of individuals deriving income from each source

| Source | Number of individuals who depends on this source |
|----------------------------|--|
| 1 Hawking (Food) | |
| 2 Hawking (Other) | |
| 3 Spaza shop | |
| 4 Selling liquor/shebeen | |
| 5 Taxi business | |
| 6 Lending money | |
| 7 Carpentry | |
| 8 Plumbing | |
| 9 Building houses | |
| 10 Crops kinds | |
| 11 Crops cash | |
| 12 Animals kind | |
| 13 Animals cash | |
| 14 Cooperative income | |
| 15 Other (Specify)..... | |

Question 3. Food Production: Crop & Animal Farming

Question 3.1 Which of these sources of food is the major sources for your household in each season?

| Source | | Season | | | |
|-----------------------------------|--|---------------------|-----------------------|--------------------|-------------------|
| | | Autumn March-May | Winter June-August | Spring Sept-Nov | Summer Dec-Feb |
| 1 Own production | | | | | |
| 2 Buying from local producers | | | | | |
| 3 Buying from local shops | | | | | |
| 4 Buying from outside the village | | | | | |
| 5 Battering of food | | | | | |
| 6 Other | | | | | |

Q3.2 Do you have a garden on your residential site?

| | |
|--------|-------|
| 1. Yes | 2. No |
|--------|-------|

Q3.3 What is its size?hectares

Q3.4 Do you grow crops in your garden?

| | |
|-------|------|
| 1.Yes | 2.No |
|-------|------|

Q3.5 Please indicate the kinds of crops you grow, the extent as well as what you do with the produce

| Crop | Extent | Yield for the previous season(Kg) | Variations in yield | What do you do with the produce? |
|-----------------|--------|-----------------------------------|---------------------|----------------------------------|
| Maize | | | | |
| Dry beans | | | | |
| Dry peas | | | | |
| Pumpkins | | | | |
| Butternut | | | | |
| Potatoes | | | | |
| Cabbages | | | | |
| Carrots | | | | |
| Beetroot | | | | |
| Spinach | | | | |
| Onions | | | | |
| Other (specify) | | | | |

Extent: 1.Major Crop, 2.Minor; Yields: e.g. maize= 40bags; Beans= 2 bags; potatoes=100bags: Variation in yields: 1.High, 2.Almost constant, 3.Low; Reason for growing: 1.Selling, 2.Consumption, 3.Both

Q3.6 Do you have access to arable fields?

| | |
|-------|------|
| 1.Yes | 2.No |
|-------|------|

Q3.7 If yes, state how many fields you have access to.....

Q3.8 What is the size of each of the fields?.....hectares

Q3.9 How did you obtain access to each of the fields?

| | |
|-------------------------------|---|
| Bought (title deed) | 1 |
| Leased | 2 |
| Inherited | 3 |
| Given by government | 4 |
| Allocated by headman | 5 |
| Renting and/or share cropping | 6 |
| Other (Specify)..... | 7 |

Q3.10 Did you grow any crops on your arable land during the past three cropping seasons?

| | |
|-------|------|
| 1.Yes | 2.No |
|-------|------|

Q3.11 If yes, please indicate the kinds of crops or vegetables you grow, the extent as well as the reasons for growing them

| Crop | Extent | Variations in yield | Reason for growing |
|-------------------|---------------|----------------------------|---------------------------|
| 1 Maize | | | |
| 2 Sorghum | | | |
| 3 Dry beans | | | |
| 4 Dry peas | | | |
| 5 Pumpkins | | | |
| 6 Butternut | | | |
| 7 Potatoes | | | |
| 8 Other (Specify) | | | |

Extent: 1.Larger, 2.Lesser; Yields: e.g. maize= 40bags; Beans= 2 bags; potatoes=100bags: Variation in yields: 1.High, 2.Almost constant, 3.Low; Reason for growing: 1.Selling, 2.Consumption, 3.Both

Q3.12 If not, please provides an explanation.

.....

Q3.13 Which factors influence your choice of crops in any growing season? Name them in order of importance.

| | | | | |
|---------|---------------|---------|----------------|----------------------|
| Q3.13.1 | Q3.13.2 | Q3.13.3 | Q3.13.4 | Q3.13.5 |
| Climate | Food security | Market | Easy to manage | Other (Specify)..... |
| | | | | |

A range between 1-2(Least important) and 3-5(Most important)

Q3.14 What method of cultivation does your household normally use?

| | | |
|---------|-----------------|----------------|
| Tractor | Animal traction | Hand ploughing |
| 1 | 2 | 3 |

Q3.15 Please indicate the source of labour (family, exchange or hired) for the following farming activities in your household. Where family labour is used, state who in the household is responsible.

| Activity | Labour source | Person responsible |
|---------------|---------------|--------------------|
| 1 Ploughing | | |
| 2 Cultivating | | |
| 3 Planting | | |
| 4 Weeding | | |
| 5 Spraying | | |
| 6 Harvesting | | |
| 7 Marketing | | |

Labour source: 1.Family, 2.Exchange, 3.Hired, 4.Family and exchange, 5.Family and hired, 6.Exchanged and hired, 7.All

Q3.16 Do you sometimes improve the fertility of the soil?

| | |
|-------|------|
| 1.Yes | 2.No |
|-------|------|

Q3.17 If yes, how do you improve soil fertility?

| | | | |
|------------------|--------------------|------|----------------------|
| Apply fertilizer | Apply kraal manure | Both | Other (Specify)..... |
| 1 | 2 | 3 | 4 |

Q3.18.1 Have you received any training on how to apply fertilizers (e.g. rates of application, timing. etc.)?

| | |
|-------|------|
| 1.Yes | 2.No |
|-------|------|

Q3.18.2 Have you received any training on when to apply fertilizer?

| | |
|-------|------|
| 1.Yes | 2.No |
|-------|------|

Q3.19 Is there anybody in your household who has received training on agriculture in general?

| | |
|-------|------|
| 1.Yes | 2.No |
|-------|------|

Q3.19.1 If yes, indicate where the training was obtained

.....

Q3.19.2 If yes, indicate when the training was obtained

Q3.20 Where do you get money to invest in farming?

| Source | Amount |
|---------------------------|--------|
| 1 Borrowing from banks | |
| 2 Borrowing from friends | |
| 3 Your own savings | |
| 4 State aid | |
| 5 Other (specify)..... | |

Q3. 21 Have you noticed any changes in the planting

| | |
|-------|------|
| 1.Yes | 2.No |
|-------|------|

season?

Q3.22 If yes how long, how long have you noticed change?

| | | | |
|---------|---------|----------|-----------------------|
| 2 years | 5 years | 10 years | More than 10 years |
| 1 | 2 | 3 | 4 |

Q3.23 Which of the following animals do you keep? Indicate numbers owned and reasons for keeping them.

| TYPE | Number owned | Reason for keeping |
|---------------------------|---------------------|---------------------------|
| 1 Chicken | | |
| 2 Pigs | | |
| 3 sheep | | |
| 4 Goats | | |
| 5 Cattle | | |
| 6 Donkeys | | |
| 7 Horses | | |
| 8 Mules | | |
| 9 Other (specify)..... | | |

1. Household consumption, 2.Ritual slaughter, 3.Sales, 4.Savings, 5.Draught power, 6.Traditional reasons (e.g lobola), 7.Other

Q3.24 What are the challenges hindering livestock productivity?

| Diseases (Specify) | Inadequate rainfall | Poor grazing pastures | Other (specify) |
|-------------------------------|--------------------------------|----------------------------------|------------------------|
| 1 | 2 | 3 | 4 |

Question 4. Markets

Q4.1 Which markets do you usually use for selling your produce?

| | | |
|----------------|------------------|---------------|
| Formal markets | Informal markets | I do not sell |
| 1 | 2 | 3 |

E2 Do you have regular customers who buy from you?

1.Yes

2.No

Question 5. Support Services, Resources and Infrastructure

Q5.1 Indicate the type of support services you have access to

| | |
|---------------------|---|
| Credit | 1 |
| Market information | 2 |
| Workshops | 3 |
| Extension services | 4 |
| Veterinary services | 5 |

Q5.2 Indicate the type of resources you have access to

| | |
|------------------|---|
| Water | 1 |
| Grazing land | 2 |
| Inputs | 3 |
| Time | 4 |
| Labour | 5 |
| Other (Specify). | 6 |

Q5.3 Which of the following equipments do you own? Please indicate whether it's yours, borrowed or hired.

| Equipment | Own | Borrowed | Hired |
|-------------------|------------|-----------------|--------------|
| 1 Plough | | | |
| 2 Planter | | | |
| 3 Cultivator | | | |
| 4 Spade | | | |
| 5 Rake | | | |
| 6 Fork spade | | | |
| 7 Hoe | | | |
| 8 Other (specify) | | | |

1. Own, 2. Borrowed, 3. Hired

Q5.4 Indicate the type of infrastructure you have access and the condition to.

| Infrastructure | Condition/Access | | | |
|------------------------|------------------|---------|---------|--------------|
| | 1. Bad | 2. Fine | 3. Good | 4. No access |
| 1 Telephone | | | | |
| 2 Electricity | | | | |
| 3 Water | | | | |
| 4 Roads | | | | |
| 5 Storage facilities | | | | |
| | | | | |
| 6 Other (specify)..... | | | | |

Question 6. Water Sources, Availability and Quality

Q6.1 Where do you get water for household use? Indicate water the sources that are adequate?

| Source | Distance | State whether adequate/unreliable |
|---------------------------------|----------|-----------------------------------|
| 1 Dam | | |
| 2 Borehole | | |
| 3 Spring | | |
| 4 Communal Well | | |
| 5 Own well | | |
| 6 Communal tape | | |
| 7 Own tape | | |
| 8 Rainwater tank | | |
| 9 River/stream (Name the river) | | |

Q6.2 What are the sources of drinking water for your livestock?

| | Dam | Borehole | River | Well | Spring | Other (Specify) |
|-----------|------------|-----------------|--------------|-------------|---------------|----------------------------|
| 1 Cattle | | | | | | |
| 2 Sheep | | | | | | |
| 3 Goats | | | | | | |
| 4 Pigs | | | | | | |
| 5 Donkeys | | | | | | |
| 6 Horses | | | | | | |

Question 7. Irrigation Schemes

Q7.1 Are you the member of any irrigation schemes?

| | |
|-----|----|
| Yes | No |
| 1 | 2 |

Q7.2 If not why?

| | | | |
|---------------|--------------------|------------------|-----------------|
| Lack of funds | Selection criteria | Social conflicts | Other (specify) |
| 1 | 2 | 3 | 4 |

Q7.3 Do you have enough information about the irrigation schemes?

| | |
|-----|----|
| Yes | No |
| 1 | 2 |

Q7.4 Are these schemes helping you out to reduce poverty or increase food security?

| | |
|-----|----|
| Yes | No |
| 1 | 2 |

Q7.5 If no why?

| | | | | |
|---------------|-------------------------|----------------------------------|---|-----------------|
| Underutilized | Water is not sufficient | Poor cooperation amongst farmers | Because of low productivity and profitability | Other (specify) |
| 1 | 2 | 3 | 4 | 5 |

Q7.6. Do you think these irrigation schemes will have positive effect on your livelihood?

| | |
|-----|----|
| Yes | No |
| 1 | 2 |

Q7.6.1 If yes, state how?

| | | | | |
|--|----------------|------------------------|-------------|-----------------|
| Increase standard of living in general | Reduce poverty | Increase food security | More income | Other (specify) |
| 1 | 2 | 3 | 4 | 5 |

Q7.6.2 If no, state why?

.....

THANK YOU FOR YOUR COOPERATION!!!!

