

**ENTREPRENEURIAL ACTIVITIES AMONG HOMESTEAD FOOD GARDENING
AND IRRIGATION CROP FARMERS IN THE NORTH WEST PROVINCE, SOUTH
AFRICA**

By

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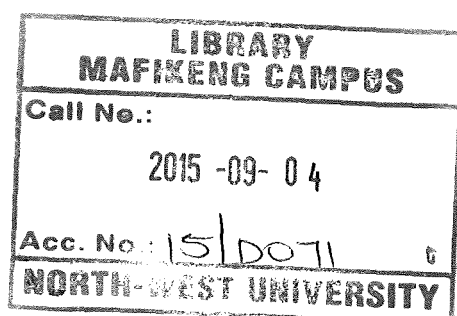
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DECLARATION

I, Remongwe Mothupi, declare that the dissertation entitled “**Entrepreneurial activities among homestead food gardening and irrigation crop farmers in the North West province, South Africa**” hereby submitted for the degree of Master of Science in Agricultural Extension has not previously been submitted by me for a degree at this or any other university. I further declare that this is my work in design and execution and that all materials contained herein have been duly acknowledged.

Signature

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ABSTRACT

Homestead food gardening and irrigation crop farming is often neglected in terms of enterprise development and classified as subsistence, the population of the study consisted of all homestead food gardens and irrigation crop farmers in the North West Province of South Africa. Due to the lack of a proper list of smallholder homestead food gardening and irrigation crop farmers, a large sample size technique of $n \geq 30$ was used to select 40 farmers from each of the four District Municipalities of the Province to give a total sample size of 160 farmers. Data was collected using a structured questionnaire and analysis done through the Statistical Package for Social Science (SPSS) version 21 using frequency count, percentages and multiple regressions.

The results show that the independent variables were significantly related with an F value of 5.21, $p < .05$. Also, an R value of 0.59 showed that there was a strong correlation between socio-economic characteristics and entrepreneurial activities. The results further predicted 35% of the variation in entrepreneurial activities. Seven out of fifteen independent variables were significant; with two variables being significant at 10% (household head and age); while five variables were significant at 5% (willingness for entrepreneurship, market outlet social participation, farming experience and types of land ownership). Significant determinants of entrepreneurial activities were entrepreneurship willingness ($t = 2.289$, $p = .024$); market outlet ($t = 2.684$, $p = .008$), social participation ($t = -2.029$, $p = .044$); household head ($t = 1.691$, $p = .093$); Age ($t = -1.924$, $p = .056$); farming experience ($t = 3.189$, $p = .002$) and types of land ownership ($t = 2.166$, $p = 0.032$).

These findings imply that the higher the willingness for entrepreneurship, marketing outlets, male-headed households, farming experience and personal land ownership, the higher the entrepreneurial activities among homestead vegetable farmers. However, age and social participation are inversely related to entrepreneurial activities among farmers. This implies that the older the farmers become, and the more farmers are involved in social participation, the lower the entrepreneurial activities among farmers.

LIST OF ABBREVIATIONS AND ACRONYMS

AFASA-African Farmers Association of South Africa
NAFU- National African Farmers' Union
WARD- Women in Agriculture and Rural Development
YARD-Youth in Agriculture and Rural Development
BAYOFA- Black African Young Farmers
TAU- Transvaal Agricultural Union
IMT- Irrigation Management Transfer
DARD- Department of Agriculture and Rural Development
FAO- Food and Agriculture Organisation
GDP- Gross Domestic Product
GIDA- Ghana Irrigation Development Authority
IRDD- Irrigation Reclamation and Drainage Department
CSA- Community Supported Agriculture
NMMDM- Ngaka Modiri Molema District Municipality
ESC- Economic, social and cultural (rights)
USGS- U.S. Geological survey

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CHAPTER ONE

1.0

INTRODUCTION

1.1 Background of the study

According to Molebatsi, Siebert and Cillier (2010), home gardens are regarded as a type of domestic garden as derived from the Greek word *domos* which means 'house'. There are many types of domestic gardens and they vary in the intensity of cultivation and location to homes. A home garden is an intensively worked land use system involving deliberate management of multipurpose plants in association with agricultural crops and invariably livestock, within the compound of individual households (Fernandes and Nair, 1986). Home gardens could be used for subsistence agriculture and commercial production of food crops (Vogl and Volg-Lusser, 2003). Similarly, Keller (2003) explains that a home garden is an area around the home where vegetables, annual and perennial plants, species, herbs, shrubs and fruits are grown seasonally or through the year to meet family requirements. It is one of the most ancient food production practices commonly practised throughout the world using different names such as home garden, nutrition garden, show garden, kitchen garden, family garden, door yard garden or back yard garden. It is important to consider the socioeconomic and cultural norms of the targeted communities in addition to the technical aspects. To ensure sustainability, home gardens incorporate local practices and methods in order to be successful (Keller, 2003).

Home gardens around the world often exhibit remarkable variations in composition and structure depending on the physiographic and climatic conditions of the area and wide variety of household characteristics. A home garden is a mixture of deliberately planted vegetation, usually with a complex structure and designed to produce natural products for the household or market (Kabir and Webb, 2008). A home garden is known by its proximity to water sources and other resources and in most cases, is near the house and could be scattered or fixed plots, large or small. It can be utilised for year round production and can provide a combination of various crops with economic importance. It has the ability to sustain diversified vegetable crop production and uses low cost inputs; the production is primarily for household consumption as it uses mainly indigenous crop varieties and plays a role in reducing dependence on hybrid seeds and managed by family members (Keller, 2003).

Home gardens are often considered as a means to improve food supply to the household. In the midst of prevailing economic crisis and a burgeoning world population, the availability of food and access to it is a pressing global issue with important ramifications for human health and the production and growth of affected countries. Consequently, it draws the concentration of development actors to understand the ultimate impact of irrigation development. It is also crucial to think about the ever increasing food deficit in the region in relation to the use of existing water resource potential.

The use of irrigation and existing water sources to improve food production particularly in water deficit area. (This sentence does not tie with the previous paragraph)

According to the Food and Agriculture Organisation (FAO, 2000), food security is achieved by having enough food present at all times in the community or nation to feed the population, households having the means for obtaining that food; individuals consuming a sufficient and balanced diet and assurance that the three conditions will be met. Economic, social and cultural (rights) (2005) states that food production can be seen as another means of market enfranchisement towards food security.

Home gardening and irrigation crop farming are crucial components of agriculture. They have created a niche for themselves in terms of production and supply to the market chain. Agriculture is now considered as a business venture and no longer has a mere meant of sustenance, hence the need for entrepreneurial activities among farmers. Pandeti (2005) maintains that the components of entrepreneurial activities are: innovativeness: farm decision-making ability; achievement motivation: information seeking ability, risk taking ability, coordinating ability of farm activities, leadership ability, assistance of management services and Cosmo politeness. It is further explained that the components are:

- Innovativeness

The degree to which an individual adopts new ideas relatively earlier than others in his or her social system.

- Farm decision-making ability

The degree of weighing the available alternatives in terms of their desirability and their likelihoods and choosing the most appropriate one for achieving maximum profit in farming.

- Achievement motivation

Operationalised as the desire for excellence to attain a sense of personal accomplishment.

- Information seeking ability

Operationally defined as the frequency of contact or exposure of a farmer to different sources in order to obtain farm information.

- Risk taking ability

Operationalised as the degree to which the farmer is oriented towards risk and uncertainty in facing farming problems.

- Coordinating ability of farm activities

Defined as the degree to which an individual co-ordinates action in a time dimensions.

- Leadership ability

Operationalised as the degree to which an individual initiates or motivates the action of others.

- Knowledge of farm enterprise
- The degree to which the factual information is possessed by the respondent regarding the farming enterprise.
- Assistance of management services

It refers to the degree to which a farmer gets assistance of management service.

- Cosmo politeness

Operationalised as the degree to which a farmer is oriented outside his or her community or village that might make him/her more accessible with innovations.

In the North West province, a home garden (*tshimo*) is defined as a land use form on private or communal land surrounding an individual house (*ntlo*) with a definite fence as border around the yard (*patlelo*), in which several useful tree species are cultivated together (intercropped) with crops and other useful plants, often with the inclusion of small livestock. Cultivated food crops are dominant compared to other species in Tswana home gardens. Maize is the dominating crop grown, followed by leafy vegetables, vegetables, tubers, fodders and grains. Fruit trees are also grown but as a mixed standards (orchards) and in most

cases, behind the house (Molebatsi, Siebert, Cilliers, Lubbe and Davoren, 2010). MEC B. Tshwene (2011) maintains that the government, through hunger alleviation programmes, distributed agriculture starter packs to households in rural areas including seedlings to families to start backyard vegetable for household food security. Household members were also trained on how to manage these projects profitably and sustainably and extension officers assisted these projects in order to ensure sustainability (Department of Agriculture and Rural Development, 2011).

1.2 STATEMENT OF THE PROBLEM

Home gardens are found in both rural and urban areas in predominantly small-scale subsistence agricultural systems (Nair, 1993). Based on research and observations in developing and developed countries in five continent of the world, Niñez (1994) defines home gardens as “a small-scale production system supplying plant and animal consumption and utilitarian items either not obtainable, affordable, or readily available through retail markets, field cultivation, hunting, gathering, fishing, and wage earning which are often located close to dwellings for security, convenience and special care”. Michelle and Hanstad (2004) mention five intrinsic characteristics of home gardens as follows: located near a residence; containing diversity of plants; producing supplementary rather than main source of family consumption and income; occupy a small area (Brownrigg, 1995); and production system that the poor can easily enter at some level (Marsh, 1998). Based on the economics of the household, Niñez (1994) differentiates between two types of home gardens: subsistence gardens and budget gardens. Landon-Lane (2011), Galhena, Freed and Maredia (2013) categorised the benefits of home gardening into social, economic and environmental. Most often, the economic potential of home gardens are not explored or maximised through commercialisation processes. There are significant opportunities to move smallholder farmers from subsistence to commercial agriculture. Many national governments and international development bodies consider intensification and commercialisation of smallholder agriculture as a central role in delivering broad-based growth in rural areas, for the majority of the poor population. Commercialisation of subsistence agriculture implies increased participation or improved ability to participate in output markets. Pingali (1997) suggests that over the time, these two aspects of commercialisation will proceed broadly in tandem. Agricultural commercialisation can be defined as a farmer’s increased responsiveness to and engagement with agricultural markets. In South Africa, like in other developing countries, smallholder farmers find it difficult to participate in markets because of a range of constraints and barriers

reducing incentives for participation (Makhura, 2001). Pingali and Rosegrant (1995) state that agricultural commercialisation transcends marketing of agricultural output, but product choice and input use decisions are based on the principles of profit maximisation, particularly for primary staple cereals and high value cash crops. On the input side, commercialisation implies that both traded and non-traded inputs are valued in terms of their market value. Poulton *et al.* (2008) define commercial agriculture as production primarily for market which is not dependent on scale of production or related to particular types of crops, while von Braun and Kennedy's (1994) definition consider the degree of dependence on markets for the supply of production inputs. Jayne *et al.* (2011) state that smallholder commercialisation refers to a virtuous cycle in which farmers intensify their use of productivity-enhancing technologies on their farms, achieve greater output per unit of land and labour expended, produce greater farm surpluses, expand their participation in markets, and ultimately raise their incomes and living standards. The drivers for commercialisation of agriculture include rising per capita income, urbanisation and globalisation (Joshi *et al.*, 2004; Parthasarathy Rao *et al.*, 2004 and Gulati *et al.*, 2005). On the demand side, while there are improvements in infrastructure, roads and markets, technology and relative profitability in various commodities, on the supply side, there are transaction costs involved by providing direct access, minimising intermediaries or commission agents and postharvest losses. Parthasarathy Rao *et al.*, (2004) found that the share of high value commodities in the production portfolio is higher in urban areas with better access to roads compared to peri-urban and rural areas in India. As people move from urban to rural production centres, the share of food grains in production increases. Also, areas that were connected with at least one national highway are production centres of high value commodities while areas that were not connected with national highways were the main centres for food grains production (Joshi *et al.*, 2004).

Commercialisation and diversification are often associated such that smallholder agriculture may yield the expected gains from specialisation and economies of scale, commercialisation is important as a livelihood strategy, source of cash income to farmers and export revenue to the country (Heltberg 2001).

Leavy and Poulton (2007) state that commercialisation, as a degree of participation in markets, could be relevant for any size of farm and any type of market such that farmers will benefit from participating wherever the opportunities are – domestic or export markets – and respond to any opportunities available. In reality, large-scale and smallholder farmers tend to

have different strengths giving them advantages in certain crops. In various countries, different modes of commercialisation co-exist and interact with each other. Gebreselassie and Sharp (2008) maintain that different existing categories of farmers could benefit from enhanced commercialisation (or market-oriented agricultural growth) and the different categories represent potentially complementary pathways for commercialisation. Furthermore, Gebreselassie and Sharp (2008) posit that the degree of market participation is influenced by the entrepreneurial behaviour of farmers. Home gardening and irrigation crop farming are often neglected in terms of enterprise development because they are often classified as subsistence. This study analyses entrepreneurial activities among homestead food gardening and irrigating crop farmers in the North West province.

1.3 RESEARCH QUESTIONS

The research questions asked were:

- What are the personal characteristics of rural dwellers engaged in home gardening and irrigation crop farming?
- What are the farm related characteristics?
- What are the entrepreneurial activities among in-home gardening and irrigated crop farmers?
- What are the constraints to entrepreneurial activities?
- What are the resource management pattern of homestead food gardening and crop irrigation farmers?
- What is the farmers' access to livelihood capital assets?
- What are the farmers' orientations towards self employment?

1.4 OBJECTIVES OF THE STUDY

The main objective of this study was to analyse entrepreneurial activities among homestead food gardening and irrigation crop farmers in the North West Province, South Africa.

The specific objectives of the study were to:

- Investigate the personal characteristics of rural dwellers engaged in home gardening and irrigation crop farming
- Examine farm related characteristics

- Identify entrepreneurial activities among in-home gardening and irrigation crop farmers
- Ascertain the constraints faced by homestead food gardening and irrigation crop farming in their engagement in entrepreneurial activities.
- Investigate the resource management pattern of homestead food gardening and crop irrigation farmers
- Analyse farmer access to livelihood capital assets
- Examine farmers orientation towards self employment

1.5 HYPOTHESIS

There is no significant relationship between personal characteristics and entrepreneurial development activities of homestead food gardening and irrigation crop farmers.

1.6 SIGNIFICANCE OF THE STUDY

The study reveals the entrepreneurial activities among homestead food gardeners and irrigating crop farmers. The findings of the study provide an opportunity for farmers to express their views on the gains from entrepreneurial activities on irrigation as well as how they obtain income and production in order to improve their livelihood. Furthermore, the research covers the impact and constraints of homestead food gardening and irrigation crop farming on the livelihood of farmers and proposes recommendations that can assist farmers on how to access information in order to improve their entrepreneurial activities and access the market and funding.

1.7 DEFINITION OF TERMS

Home gardening - is a mixture of deliberately planted vegetation, usually with a complex structure and designed to produce natural products for the household or market.

Food security - is a flexible concept used to refer to a situation when all people at all times, have access to sufficient, safe, nutritious food to maintain a healthy and active life. It includes physical and economic access to food that meets people's dietary needs as well as their food preferences. The three pillars or core determinants of food security are food access, food availability and food utilisation.

Irrigation - is the action of applying water to land in order to supply crops and other plants with necessary water. Sometimes, nutrients may be applied through irrigation as well.

Productivity - The effective use of innovation and resources to increase the value added content of products and services. It is the true source of competitive advantage that creates long-term economic viability and a better standard of living.

Enterprise - A project undertaken or to be taken, especially one that is important or difficult or that requires boldness or energy.

Entrepreneurial activities - It is the enterprising human action in pursuit of the generation of value, through the creation or expansion of economic activity by identifying and exploiting new products, processes or markets.

Nutrition - It is the intake of food, considered in relation to the body's dietary needs

Smallholder - Farmers owning small-based plots of land on which they grow subsistence crops and one or two cash crops relying almost exclusively on family labour.

Homestead - Self sufficiency where ever you live. It is about using less energy, eating local food, involving your family in the life of the community and making wiser choices that will improve the quality of life for your family.

Home garden – It is an area around the home where vegetables, annual and perennial plants, species, herbs, shrubs and fruits are grown seasonably or through the year to meet family requirements.

1.8 OUTLINE OF THE STUDY

The study is divided into five chapters. The first chapter introduces the study and sets the context. It also presents the statement of the problem and specifies the objectives of the study. Definition of key terms and concepts are also outlined.

Chapter Two is the literature review and is presented in relevant sub-sections as follows: overview, types and benefits of irrigation, the concept of smallholder irrigation farming, smallholder irrigation farming in India, smallholder irrigation farming in Ghana, smallholder irrigation farming in Malawi, smallholder irrigation farming in South Africa, classification of smallholder irrigation farmers, concept of home gardening, home gardening in the United States of America home gardening in Bangladesh, home gardening in South Africa and small scale farmers entrepreneurial behaviour.

Chapter Three describes the study area and the methodological approach employed in order to achieve the objectives. It further gives more detail on data collection methods and other analytical procedures used in the study.

Chapter Four is the presentation and discussion of the findings of the study.

Chapter Five summarises the study and provides the conclusions and recommendations.

1.9 SUMMARY OF CHAPTER

This chapter has presented the background of the study, statement of the problem, research questions, objectives of the study; hypothesis, significance of study, definition of terms and outline of the study.

CHAPTER TWO

2.0

LITERATURE REVIEW

2.1 INTRODUCTION

This chapter focuses on the views of different authors who have conducted research on issues related to this study in the past. It presents an overview, the types and benefits of irrigation, the concept of smallholder irrigation farming, smallholder irrigation farming in India, Ghana, Malawi and South Africa, the classification of smallholder irrigation farming, the concept of home gardening, home gardening in USA, homestead gardening in Bangladesh, home gardening in South Africa and entrepreneurial behaviour of small scale farmers.

2.2 OVERVIEW, TYPES AND BENEFITS OF IRRIGATION

Irrigation is the controlled application of water for agricultural purposes through manmade systems to supply water requirements not satisfied by rainfall. As demonstrated by U.S. Geological survey (2013), crop irrigation is vital throughout the world in order to provide the world's ever growing populations with enough food. Agriculture plays a vital role in the economy but is predominantly dependent on natural rainfall. Irrigated agriculture on fairly limited scale is a recent phenomenon and was necessitated largely by the seasonally and unreliability of natural rainfall as syndicated by (Kyei-Baffour & Offori 2005). There seems to be a general consensus that improving agriculture and enhancing agricultural productivity through irrigation will remain the key strategy for rural poverty alleviation in most low income countries, where the majority of the rural poor depend directly or indirectly on agriculture (Fanadzo, 2012). Smallholder irrigation involves the diversion of water from one area into a relatively small area for the purpose of supplementing available crops (FAO, 2001). The techniques of diverting the water include the use of gravity through canals or pipes and lifting water through the use of pumps for application in the fields through various irrigation methods (FAO, 2001) with the objective of increasing food production. Gomo (2010) maintains that irrigation offers the potential to move to year round cropping, generating higher annual yields from a single plot and allows farmers to diversify and plant alternative cash or food crops. For best results, irrigation should be combined with other measures to improve crop diversity, crop yield, soil erosion, support for market access and the development of crop and seed banks (Kilpatrick, 2011).

Irrigation schemes are meant to improve the standard of living of the rural poor. Therefore, expectations can be related to social, equity, economic and any other policy-directed goal. Fanadzo, Chiduzo and Mnikeni, (2010) point out that irrigation schemes fulfil one or more of the following objectives: increasing economic return to the implementer; increasing agricultural intensification and thus enhancing production and productivity; securing self sufficiency in food production and maintaining food security; providing opportunities for optimal allocation and utilisation of resources, generating employment to the rural poor and making use of available labour resources; and maximising the welfare of the community. Irrigation schemes can be considered as a means for fulfilling specific objectives of food security and as part of the long-term poverty reduction strategy (Gomo, 2010).

Irrigation has historically been a major factor for increasing crop productivity; it raises the productivity of land directly by providing sufficient water supply to raise the yield per hectare per crop and by allowing a second crop to be grown during the dry season when yields are potentially higher (Ali, 2010). Irrigation development in the past started as an intervention to dreadful agro-climate in low rainfall areas and seasons. Van Averbek and Mohamed (2006) state that modern technology provides ways through which the effects of natural and manmade disasters could be tackled. They argue that this can be achieved by using irrigation development structures. The benefits of irrigation are as follows: Access to reliable irrigation can enable farmers to adopt new technologies, leading to increased productivity, overall higher productivity and greater returns from farming. This in turn, opens up new opportunities both on farm and off farm and can improve income, livelihoods and the quality of life in rural areas (Hussain and Hanjra, 2004).

Hussain and Hanjra (2004) mention five key interrelated dimensions of the relationship between accesses to good agricultural water, socio economic uplifting in rural communities and poverty reduction. The dimensions are production, income/consumptions, employment, vulnerability/food security and overall welfare. In general, access to good irrigation allows poor people to increase their production and income, enhances opportunities to diversify their income base, reducing vulnerability caused by the seasonability of agricultural production as well as external shocks. Thus, access to good irrigation has the potential to contribute to poverty reduction and the movement of people from ill-being to well being (Hussain and Hanjra, 2004). Increased output from irrigated agriculture may arise from improved yields, reduced crop loss, improved cropping intensity and increased cultivated area. Accordingly, reliable access to water enhances complementary inputs such as high yields cultivars and

agrochemicals which also increase output levels, improve farm income and reduce poverty (Fanadzo, 2012).

Irrigation facilitates agricultural production intensification. In Zimbabwe, irrigation schemes have assisted in improving agricultural productivity and this could be due to the level of input needed and utilised. It can also help to diversify product type as many research findings attempt to prove that choices of crop types could be facilitated by irrigation and increase food variety and availability. Lastly, it can assist in presenting alternative cropping pattern decisions between cash and food items. Intercropping gives more stable cash flow and is a way of diversifying income on scarce land resources. Mixed cropping practices also spread the labour demand over a longer time period (FAO, 2000).

Irrigation schemes could be classified as traditional and modern. Modern irrigation systems serve the same purpose traditional systems. Apart from the differences in their technological advancement, they are designed with the aim of securing sustainability and productivity. Traditional irrigation schemes were developed in different parts of the world by communities as an intervention to climatic challenges. Irrigation schemes can be classified into two groups based on their structures as follows: river diversion and dam construction. Others distinguish between intensive and extensive, yet other divisions can be made as productive and protective irrigation systems (Rees Ton and Kees Dejong, 1991). There are different ways of supplying irrigation water to the farm. The following are the types identified by CDC (2009): Surface irrigation -Water is distributed over and across land by gravity, no mechanical pump involved. Localised irrigation-Water is distributed under low pressure through a piped network and applied to each plant. Drip irrigation-A type of localised irrigation in which drops of water are delivered at or near the root of plants, evaporation and run off are minimised in this type of irrigation. Sprinkler irrigation-Water is distributed by overhead high pressure sprinklers or gun from a central location in the field or from the sprinkler on moving platforms. Centre pivot irrigation -Water is distributed by a system of sprinklers that move on wheel towers in a circular pattern. This system is common in flat areas. Lateral move irrigation-Water is distributed through a series of pipes; each with a wheel and a set of sprinklers rotated either by hand or with a purpose built mechanism. The sprinkles move a certain distance across the field and then need to have a water hose connected for the next distance. This system is less expensive but requires more labour than others. Sub-irrigation-Water is distributed across land by raising the water table through a system of pumping stations, canals, gates and ditches. This type of irrigation is most effective in areas with high

water tables. Manual irrigation-Water is distributed across land through manual labour and watering cans. This system is very labour intensive

In addition, USGS (2013) describes irrigation methods as follows: Flood irrigation-The application of irrigation water where the entire surface of soil is covered by ponded water. Furrow irrigation-A partial surface flooding method or irrigation normally used with clean tilled crops where water is applied in furrows or rows of sufficient capacity to contain the designed irrigation system. Gravity irrigation- This is when water is not pumped but flows and is distributed by gravity. Rotational irrigation- This is a system by which irrigators receive an allocated quantity of water not at a continuous rate but stated intervals. Supplemental irrigation ensures increased crop production in areas where rainfall supplies most of the moisture needed, while surface irrigation is where soil surface is used as a conduct, as in furrow and border irrigation as opposed to sprinkler irrigation or sub-irrigation. Irrigation structures are divided into different scales based on their irrigating potential as follows: Small scale irrigation schemes, medium irrigation schemes and large scale irrigation schemes (Kyei-Baffour and Ofori, 2006).

Increase in agricultural productivity increases the income of people engaged in it and consequently their purchasing power. Thus, it secures access to marketable food items. Irrigation also enables producers to select high calorie crops for their production through the continuous flow of water. The availability and use of such method affects cropping patterns and related cropping decisions (Bagson and Wuleka Kuuder, 2013). Cropping system can be defined as a multi-crop rotation in a particular area undergoing crop production (Koch and Khosla, 2003). Expansion and intensification are systems by which irrigation enhances agricultural production because such interventions can increase the number of harvesting times within a year (Fanadzo, Chidzuza and Mnikeni, 2010).

Studies of small scale irrigation schemes across Africa have shown that irrigation improves income levels. The potential for irrigation development in Nigeria is tremendous. The benefits extend beyond increased agricultural productivity as it gives women time to start market gardens, helps families reduce debt, increases school attendance, limits seasonal migration for work and improves cash earnings ability to pay for health care and other necessities (Suleiman, 2010). A study of three small scale schemes in Burkina Faso, Mali and the United Republic of Tanzania found that irrigation improved income levels, diets and health (FAO, 2000). This in turn, enables access to food by improving the purchasing power

of individuals. It has been found that the existence of irrigation can increase income by creating more employment since it is labour intensive (Kilpatrick, 2011).

2.3 THE CONCEPT OF SMALLHOLDER IRRIGATION FARMING

The term smallholder is often defined and used in an inconsistent manner to refer *inter alia*, to producers who sell products for cash as a supplement to other sources of income, to those who regularly market a surplus after their consumption needs have been met, and to small scale commercial farmers whose primary focus is on production for the market (Cousins, 2010). In South Africa, the term smallholder or small scale irrigation is mainly used to refer to irrigated agriculture practised by black people (Van Averbeke and Mohamed, 2006). On the other hand, (Gomo, 2010) explains that the terms smallholder, small scale, subsistence, communal and emergent farmers have been loosely used to mean the same thing although they have different names (Fanadzo, 2012). There are different terms to describe smallholder farmers such as small scale farmers, peasant farmers, food deficit farmers, household food security farmers, land reform beneficiaries and emerging farmers (Machethe, Mollel, Ayisi, Mashatola, Anim and Vanasche, 2004).

2.4 SMALLHOLDER IRRIGATION FARMING IN INDIA

In India, smallholder farmers are vital for India's agriculture and rural economy. Smallholder farmers are defined as those marginal and sub-marginal farm households that own or/and cultivate less than 2.0 hectares of land - constitute about 78% of the country's farmers (Agricultural Census 1990-91). These smallholders owned only 33% of the cultivated land and their contribution to national grain production was nonetheless, 41%. Their contribution to household food security and poverty alleviation is thus disproportionately high and is increasing. Moreover, as the national population increases, so does the number of smallholdings. The 1990's witnessed high GDP growth rate. Nonetheless, there has been no accompanying decrease in the high proportion of the national workforce that depends upon agriculture for livelihood. Neither the cities nor the large scale commercialised agriculture have provided employment to the many small scale farmers and rural poor. National and state policies for agriculture and for rural development to lessen poverty and hunger must accommodate this internationally atypical circumstance. Smallholder families constitute more than half of the national population. It is thus disappointing that notwithstanding their substantial and increasing contribution to the national food supply and to agricultural GDP, these smallholder families nonetheless constitute more than half of the nation's total of hungry and poor people. Policies and programmes to lessen poverty and food insecurity and

to enhance equity and sustainability of incomes and livelihoods should seek to achieve an agriculture led broad-based economic development. This could be achieved by according highest priority to small scale agriculture (Singh, Kumar, Woodhead, 2002).

In India, 90% of the fresh water diverted for human use goes to irrigation. Improving irrigation efficiency is the most direct way to address growing sectoral and regional water shortages. The most efficient irrigation method is the drip irrigation. The government of India has provided subsidies for drip irrigation in the sixth, seventh and eighth five year plan and subsidies have encouraged some farmers to install drip systems. The International Development Enterprises, a non-profit organisation specialising in affordable small scale irrigation, has developed and field tested a variety of low cost drip systems for small scale farmers. Each low cost drip system is suitable for small scale farmers cultivating sugar cane, cotton, vegetables and horticultural crops on small plots in semi-arid or hill areas (Polak & Sivanappan, 1998).

The system used is the bucket kits for home gardens. It is derived from the Chapin Bucket system and consists of an ordinary 20 litre household bucket installed on a pole at shoulder height. The bucket is fitted with 10 metre lateral line and filled 2 to 4 times a day. The lateral line has 26 micro tubes attached, each of which waters 4 vegetable plants enough to provide vegetables for a family of 6. Shift able drip systems are conventional drip systems and require a plastic pipe (lateral line) for each row of plants. The shift able drip system was first developed in Nepal to substitute low cost labour for capital by making lateral lines shift able so that each line is capable of irrigating ten rows of plants instead of one. An off the shelf plastic tank placed 2 to 4 metres above the field with a simple cloth filter provides the pressure needed by the system. Water drips out of baffled holes or curled micro tubes inserted into a hole in the lateral line. This system works well for closely spaced low growing crops like vegetables, especially in areas with low labour costs. Non shift able micro tube system has a drum kit which uses a 200 litre drum made of steel or plastic with a simple filter from which extends five 10 metre lateral lines, each fitted with 26 micro tubes. The drum kit irrigates 125 square metre plots. The non shift able micro tube system can be used on small or large plots, ranging from 1/16 of an acre to 2 acres. Micro tubes are installed into holes in plastic lateral lines with each micro tube irrigating four plants. By extending micro tubes out on both sides, each lateral line irrigates four rows of crops instead of one. The system is pressurised by a concrete tank with a low cost filter 4 metres above the field or adapted to an existing electric or diesel pump using a bypass valve (Singh, Kuhmar and Woodhead. 2002).

2.5 SMALLHOLDER IRRIGATION FARMING IN GHANA

In Ghana, there are places considered as food basket zones and suitable for irrigation schemes but the political will to invest in irrigation schemes is declining. However, there are non-governmental organisations in some rural areas in Ghana that are gradually introducing rural-dwellers to food crops cultivation through small irrigation schemes. Bagson and Wuleka Kuuder (2013) maintain that irrigation farming is a source of income for peri-urban dwellers and also a source of income for disadvantaged rural people (Chazovachii, 2012). Irrigation farming has become a relief to the rural poor and disadvantaged, especially in developing countries. Moreover, irrigation is a welfare enhancing agent because it fosters the cultivation of early maturing vegetables for both household consumption and sale (Bagson and Wuleka Kuuder, 2013). In the Ministry of Food and Agriculture (MoFA0), the Ghana Irrigation Development Authority (GIDA) is the main institution in charge of irrigation. It started in the early 1960s as a land planning unit of MoFA. It was upgraded in 1964 and referred to as the Irrigation, Reclamation and Drainage Department (IRDD) and later became the Irrigation Department. It provides all agricultural inputs and extension services, delivers water to farmers and secures the repayment of credits. It is also expected to exercise management control over its irrigation dams, associated catchment areas and over the drainage of irrigated areas and general water quality, especially within its project areas. Due to its vast terms of reference, together with scarce available resources, GIDA offers poor services and its irrigation projects have often been unsuccessful because of lack of technical support (FAO, 2005).

2.6 SMALLHOLDER IRRIGATION FARMING IN MALAWI

Malawi is related to other Southern African countries because of its adoption of new water, land and irrigation policies and legislation involving the promotion of decentralised management, water user groups and the privatisation of resources previously under customary or public tenure. As land pressure and climate change intensify, Malawi is turning increasingly to irrigate agriculture as a means of increasing production. Irrigated agriculture is regarded as a means of boosting incomes and food security and is considered to be a way of reducing poverty by government and producers (Ferguson and Mulwafu, 2005). Malawi is a country of small scale producers, farming small plots of land. Traditionally, they grow maize and other crops using rain water, but as climate change intensifies, rain in Malawi is becoming erratic and less predictable. Malawi has abundant fresh water resources, thirteen

perennial rivers and three lakes cover almost 20% of the surface area of Malawi. Despite this, only a small proportion of agricultural land is irrigated. In 2005, drought in Malawi caused a major food emergency affecting some five million people. Since then, the government has introduced a programme of fertilizers subsidies and food production has recovered. Malawi has been able to harvest several bumper crops of its staple food, maize. In 2007, Malawi even became a regional exporter of surplus maize. Small scale farmers in Malawi traditionally grow maize. Other important smallholder crops include cassava, sweet potatoes, rice, sorghum, ground nuts, pulses and tobacco. Rain fed farming relies on good rainfall but because of changes in climate, rainfall in Malawi is becoming increasingly erratic. Farmers are experiencing more frequent and severe droughts and destruction of crops as well as soil erosion when the rains are intense and unpredicted. Given the small sizes of most Malawians, improving agricultural productivity is essential for improving food security (Kilpatrick, 2011).

2.7 SMALLHOLDER IRRIGATION FARMING IN SOUTH AFRICA

Farming, as with small enterprises in general, is inherently risky and the simple reproduction of rural household is by no means assured. Producers have to contend with both risks and opportunities arising from their conditions of access to land, credit and markets, their relationship with powerful groups such as landowners or agro processing companies, the vagaries of nature, relative prices within markets for inputs, outputs and consumer goods and state policies. Within capitalism, small productive enterprises based on family labour power are best understood as petty commodity producers (Bernstein, forthcoming). Such producers combine the class places of capital and labour within the enterprise: they own the means of production, unlike landless workers and are in these sense, capitalists but also use their own labour power, unlike capitalists who hire the labour of workers. Some may hire occasional labour for specific purposes. Some agricultural petty commodity produce a substantial surplus over and above the amount needed to secure their simple reproduction and can reinvest all or part of this surplus in extending the material base of production units (through cultivating more cropping land, intensifying land use through irrigation or the application of higher levels of fertilizer) (Cousins, 2010).

South Africa is an arid country with limited water resources and moderately traditional irrigation. In addition to the emphasis on the creation of large and medium scale irrigation schemes, there has also been inadequate support to informal irrigation. In terms of small scale farms, the most successful ones are those that developed from farmers' initiatives. The spirit

of small scale irrigation is the fact that it is managed and controlled by farmers who are the users. Small scale irrigation is easiest where a farmer has independent access to a water source (FAO, 2005).

Over the past three decades, the world's irrigation sector has been increasingly exposed to decentralisation and privatisation and many countries have embarked on a process to transfer the management of smallholder irrigation system from government agencies to local management entities (Vermillion, 1997). This process of irrigation management transfer (IMT) includes state withdrawal, promotion of water users' participation, development of local management institutions and the transfer of ownership and management. South Africa has just initiated IMT in government smallholder irrigation schemes located in former homeland areas and most transfer operators are still unsure about how to design and implement the process (Perret, 2002). Similarly, Malawi has since 1999; adopted new irrigation, land and water policies and supporting legislation have been approved by parliament. The thrust is to privatise resources which once were under customary tenure or which were viewed as a common good, customary land to be titled, use of water for productive purposes to require permits and government run smallholder irrigation schemes turned over to users (Ferguson and Mulwafu, 2005).

2.8 CLASSIFICATION OF SMALLHOLDER IRRIGATION FARMERS

Smallholder irrigators in South Africa have been categorised into four groups: home gardeners, community gardeners, farmers on irrigation scheme and independent irrigation (De Lange, 1994; Fanadzo, Chiduza and Mnikeni, 2010). The most common irrigation method found on schemes is the sprinkler irrigation followed by the flood, centre pivot micro and drip irrigation. An indigenous flood irrigation system of short furrows is widely used and is very popular because of its manageability and maintainability and does not use sophisticated equipment. Small basin irrigation is used for trellised row crops such as tomatoes. Similar systems are used widely in other African countries (Fanadzo, Chiduza and Mnikeni, 2010).

Vegetable gardeners: Small and micro scale vegetable farming present a significant and important sector of irrigation farming in rural and urban areas. It is estimated that at least 150 000 growers participate in community gardening projects in South Africa and an unknown number grows food in home gardens. Community gardens are similar to irrigation schemes in that a group of farmers shares infrastructure for water supply. These irrigated

food plots constitute one of the biggest success stories in agricultural development in South Africa and their success is in sharp contrast to the problems of many of the sophisticated top - down managed larger irrigation schemes. Community gardening plays a role in giving individuals the opportunity to develop virtually a full range of entrepreneurial and farming skills on small enterprise. It is unique in the opportunity with which it can provide the poorest of the poor to improve their standard of living (Fanadzo, Chiduza and Mnikeni, 2010).

Garden irrigation technology: Different irrigation technologies are used on community gardens and many gardens are being irrigated by bucket, directly from rivers and springs or from earth furrows. Some of the gardens have pumping equipment and water is pumped either into a reservoir or directly into a distribution network of pipes and tap stands, sometimes, hosepipes are used with the tap stand system. Furrow irrigation is also used (Fanadzo, Chiduza and Mnikeni, 2010).

Independent farmers: Independent irrigation farmers are those who do not participate in an irrigation scheme or in a gardening group. They have a private water supply such as pumping directly from a river or from a borehole. Independent farmers live out of farming even though others consider farming as a source of additional income. Independent farmers usually start their irrigation enterprise using their own capital and their enterprises can be from small vegetable or fruit tree plots to fairly large commercial units. The commodities produced are: maize, sunflower, wheat, Lucerne, vegetables, citrus, cotton, sugar cane, fruits and ground nuts (Fanadzo, Chiduza and Mnikeni, 2010).

2.9 THE CONCEPT OF HOME GARDENING

Landon-Lane (2011) explains that home gardens have been an integral part of local food systems in developing countries around the world. Many studies provide descriptive evidence and analysis of home gardens in developing countries in Asia, Africa, and Latin America and pinpoint their numerous benefits to communities and families. They encapsulate perpetual small scaled subsistence agricultural systems established by the household to obtain and supplement the food requirements of the family. Sthapit, Rana, Hue and Rijal (2004) state that the home garden frequently uses family labour. Women, children and elders are of partial importance in their management (Fernandes, Nair, 1996,) (Torquebiau, 1992). Home gardens are found in rural and urban areas in predominantly small scale subsistence agricultural systems (Nair, 1993). The very beginning of modern agriculture dates back to subsistence production systems that begin in small plots around the household.

These gardens are meant to play a role in providing food for the household and income for the family (Marsh, 1998). The household garden is a small-scale production system supplying plant and animal consumption and utilitarian items either not obtainable, affordable, or readily available through retail markets, field cultivation, hunting, gathering, fishing and wage earning. Household gardens tend to be located close to dwellings for security, convenience and special care. They occupy land marginal to field production and labour marginal to major household economic activities. The specific size of the home garden from household to household and normally, their size is less than that of the arable land owned by the household. However, this may not hold true for those families that do not own agricultural land and for the landless (Ranasinghe, 2009).

2.10 HOME GARDENING IN THE UNITED STATES OF AMERICA

Gardening in the United States of America (USA) is shown to have a multitude of motivating factors, including economic, environmental, political, social and nutritional. Community gardens are especially interesting for anthropologists as they provide space for social interaction, gardens for community events, provide safe spaces for children and perhaps most importantly, simply provide an opportunity for people to socialise with each other. The structure of community garden sites is as diverse as the people who compose them. There are four types of community gardens in USA, although many more exist: individual plot gardens, communal plot gardens, community support agriculture and outreach gardens. In individual plot gardens, individuals rent plots from a central authority that owns the land, the money to buy communal seeds, mulch, soil, tools and other garden necessities. Individuals grow their own food alongside other gardeners while the gardeners themselves grow some communal products. In communal plot gardens, all land products grown there are shared. Considering the fact that there are no individual plots, plants are shared according to membership in the garden.

Community Supported Agriculture (CSA) groups connect farmers with non-farming consumers. Individuals buy shares in the CSA and meet at a central location to pick up their weekly produce allotment. Produce is paid in advance and all the food crops are recently harvested and locally grown. Although CSAs are not gardens per se, they provide a communal space and expose consumers to fresh food. Fresh food refers to products sold within a few days of being harvested which tend to sacrifice variety and choice at the expense of seasonal availability. To keep providing the diversity and quality expected by consumers, supermarkets must ship and truck seasonal food from its source, lengthen the time between

harvest and consumption to maintain variety. The last garden type is outreach gardens, in which community organisations build open gardens on their premises. School, business and church gardens can be as community outreach gardens (Flachs, 2010).

2.11 HOMESTEAD GARDENING IN BANGLADESH

According to Asaduzzaman, Naseem and Singla (2011), homestead gardening is the practice of using small plots of land in a homestead to grow food, mainly vegetables. Vegetables can play an important role in reducing food insecurity, hunger and malnutrition for resource poor rural households in developing countries. Homestead gardening can also provide the much needed employment as well as supplementary income. The potential for a homestead as productive asset is immense among poor and rural households. Homestead vegetable can play a significant role in improving food security for the resource poor rural households in developing countries like Bangladesh. One of the major constraints to achieving food security in Bangladesh is the scarcity of productive cultivated land. Of the 97.5 million rural households, nearly 30% are landless and do not have cultivable land other than their homesteads (BBS, 1999). In spite of the scarcity of land and the small size of land holding, the majority of rural households including those considered functionally landless, usually have small plots of land next to their homesteads and can be used to grow essential commodities for subsistence (Abedin and Quddus, 1990). These fragments of land referred to as homestead gardens are usually smaller than 500m² surrounding the homestead, mainly with space for livestock, trees and vegetable beds (Brifley, 1985). Homestead-based intervention like vegetable gardening has been playing an important role to alleviate poverty for resource poor people of developing countries. Among the types of homestead vegetable gardening practised in Bangladesh, developed gardening has been favoured over other types of gardening because of its ability to contribute towards food and nutrition security better than other types of gardens (Asaduzzaman, Naseem and Singla, 2011).

2.12 HOME GARDENING IN SOUTH AFRICA

South Africa is unlikely to appear in the list of high risk category in any international rating of food security. Despite its comparatively unfavourable natural resource base in most years, it is a net exporter of agricultural commodities. Its per capita income is high for a developing country. It does not have a tight foreign exchange constraint, it is not landlocked and its transport infrastructure is generally good. Its constitution entrenches the right to adequate nutrition for all and the country has devised a National Integrated Food Security Strategy (De Klerk, Drimie, Aliber, Mini, Mokoena, Randela, Moselle, De Swardt and Kirsten, 2004). The

link between food gardens and nutrition seems obvious and the promotion of vegetable gardening is often undertaken on nutritional grounds (Nigel, Webb, 2000). Food gardens are significant in promoting adequate nutrition as part of a comprehensive strategy for households coping with HIV/ AIDS and for all households, particularly those in low income communities. Domestic food gardens are often equated with urban agriculture (De Klerk, Drimie, Aliber and Mini, 2004). There is a food security policy and Zero Hunger strategy that promotes equity and prioritises the eradication of poverty and reduction of inequality among the masses. Despite the challenges regarding food security status in South Africa, there is a mantra of each and every family in South Africa which is one family, one garden (Joemat-Pettersson, 2012).

2.13 ENTREPRENEURIAL BEHAVIOUR OF SMALL-SCALE FARMERS

According to Pandeti (2005), entrepreneurial behaviour refers to an act of doing things, economic activities in particular, that have been there but in a newly improved way. The following components of entrepreneurial behaviour were used to substantiate the definition. These components are: a) Innovativeness - It is the degree to which an individual adopts new ideas relatively earlier than others in his/her social system; b) Farm decision-making ability - It is the degree of weighing the available alternatives in terms of their desirability and their likelihoods and choosing the most appropriate one for achieving maximum profit on the farming; c) Achievement motivation - It is operationalised as the desire for excellence to attain a sense of personal accomplishment; d) Information seeking ability - It is operationally defined as the frequency of contact or exposure of a farmer to different sources for obtaining farm information; e) Risk taking ability - It is operationalised as the degree to which the farmer is oriented towards risk and uncertainty in facing problems in farming; f) Coordinating ability of farm activities - It is defined as the degree to which an individual coordinates action in a time dimensions; g) Leadership ability - It is operationalised as the degree to which an individual initiates or motivates the action of others; h) Knowledge of farm enterprise - It is the degree to which the factual information is possessed by the respondent regarding the farming enterprise; i) Assistance of management services - It refers to the degree to which a farmer gets assistance of management service; j) Cosmo politeness - It is operationalised as the degree to which a farmer is oriented outside his community or village that might make him/her more accessible with innovations.

2.14 SUSTAINABLE RURAL COMMUNITIES CONTRIBUTING TOWARDS FOOD SECURITY FOR ALL

South Africa's rural strategy aims at strengthening food security and agricultural competitiveness, while lifting marginalised rural households, especially in former homelands, out of poverty. Chronic underdevelopment with its social, economic and cultural dimensions still continues in many rural areas. To transform the rural economy, investment is required in infrastructure, services, skills and productivity. By 2030, the rural economy (agriculture) should create close to one million new jobs, contributing significantly to reducing overall unemployment. The main policy imperatives are:

- Smallholder farmer development and support (technical, financial and infrastructure);
- Improved food security;
- Support for sustainable rural enterprises and industries characterised by strong rural-urban linkages;
- Sustainable land reform for agrarian transformation;
- Increased investment in agro-processing, trade development and improved access to markets and financial services resulting in rural job creation;
- Improved land administration and spatial planning for integrated development in rural areas; and
- Increased access to quality basic infrastructure and services, particularly education, health care and public transport in rural areas.

Achieving this vision and these targets will require improved coordination between land reform and land use, provision of communal tenure security, increased financial and technical support to farmers and the provision of improved social and physical infrastructure. It will also require capacity building to enable state institutions and private industries to implement these interventions. Improved coordination and integration in the planning and implementation of area-based and differentiated rural development plans will be needed to achieve the vision of an inclusive rural economy (MTSF, 2014-2019).

2.15 ENTREPRENEURIAL ACTIVITY

According to GEM (2013), Total early stage Entrepreneurial Activity (TEA) includes individuals in the process of starting a business and those running new businesses less than three and half years old. As a percentage of the adult population, these rates tend to be highest for the factor driven economies, and decline with increasing levels of GDP. The main

reason for this stylised fact is that higher levels of GDP yield more and better job opportunities. At the very highest GDP levels, however, some economies deviate from this trend with higher TEA levels. Economies that see many businesses being started also witness high percentages of individuals abandoning or discontinuing their entrepreneurial activity. The rate of business discontinuance is highest in the factor-driven economies, mainly in sub-Saharan African economies-citing an unprofitable business, problems getting finance and personal reasons as the most common motive for discontinuing. Financial issues (unprofitable business or problems obtaining finance) remain the most important reasons mentioned for business discontinuation in the majority of economies, and also in other stages of economic development. However, in some (mainly-innovation driven) economies, a significant share of entrepreneurs who discontinued owning and managing their business did so for positive reasons such as being able to sell the business, or the opportunity to get a good job, and for some, improvement in their personal situation.

2.16 Summary of chapter

This chapter has explored the perspective of different authors in terms of overview, types, and benefits of irrigation, the concept of smallholder irrigation farming, smallholder irrigation farming in India, smallholder irrigation farming in Ghana, smallholder irrigation farming in Malawi, smallholder irrigation farming in South Africa, and classification of smallholder irrigation farmers, concept of home gardening, home gardening in USA, home gardening in Bangladesh, home gardening in South Africa and small-scale farmers entrepreneurial behaviour, sustainable rural communities contributing towards food security for all, as well as entrepreneurial activity.

CHAPTER THREE

3.0

METHODOLOGY

3.1 INTRODUCTION

This chapter focuses on the research methods used in conducting this study and the specific research tools. The research design, type of study, study area, sampling frame, sampling size, data collection and methods of data analysis are also described.

3.2 STUDY AREA

The study was conducted in four districts of the North West province. The North West province is made up of four district municipalities, namely, Bojanala Platinum, Ngaka Modiri Molema, Dr Kenneth Kaunda and Dr Ruth Segomotsi Mompati.

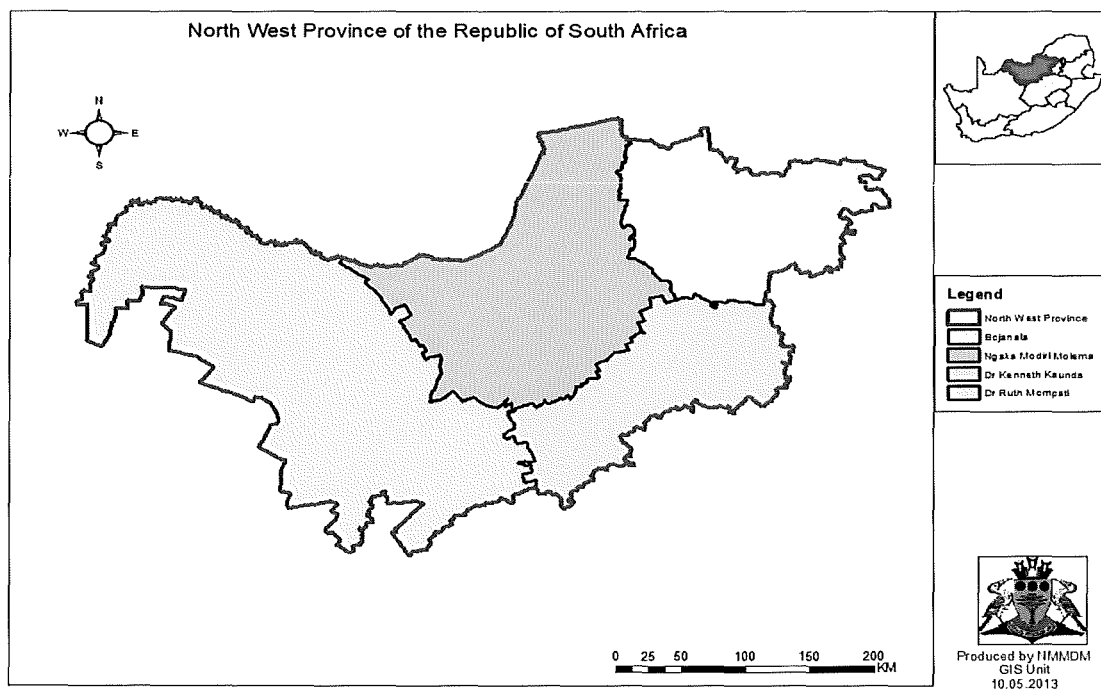


Figure 1: Map of the North West Province NMMDM 2013

3.3 DESCRIPTION OF THE STUDY AREA

According to the North West Parks Board, the surface area of the North West Province of South Africa stands at 118,797 sq km (45,869 sq miles). It shares its international border with Botswana and within the country, it is bordered on the south by the Free State and the Northern Cape, and on the northeast and east by Limpopo and Gauteng provinces. The North

West province was created in 1994 by the merger of Bophuthatswana, one of the former Bantustans (or black homelands) and the western part of Transvaal, one of the four former South African provinces. Most residents in this province are the Tswana people who speak Setswana. Smaller groups include Afrikaners, Sotho and Xhosa speaking people. English is spoken primarily as a second language. Majority of the inhabitants are Christians.

The North West province consists of flat areas of scattered trees and grassland. It has a variety of vegetation around it; some areas have mixed bush velds with plant species such as Sandvaal boom (*Terminalia Sericea*), Wlid Senga (*Burkea Africana*) and grass species such as Elephant grass (*Eragrostis Pallens*). Some have Sourish Mixed bush veld which consist of more acacia savannah with tall dense grasslands. Another part of the province is covered with Kalahari thorn veld and shrub bush veld, vegetation of acacia species such as Camel Thorn (*Acacia Giraffe*) and common grasses that include species like Blue seed grass (*Eragrostis Lehmanniana*). There are a few mountainous areas like The Magaliesberg mountain range in the northeast which extends about 130 km (about 80 miles) from Pretoria to Rustenburg. The Vaal River flows along the southern border of the province. Temperatures range from 17° to 31° C (62° to 88° F) in summer and from 3° to 21° C (37° to 70° F) in winter. Annual rainfall totals about 360 mm, with almost all of it falling during the summer months, between October and April.

3.4 ECONOMIC ACTIVITIES

The major economic activities of the North West Province are mining and agriculture. Mining generates more than half of the province's gross domestic product and provides jobs for the local population and people from other provinces and nearby countries like Botswana, Lesotho and Zimbabwe. Minerals such as gold is mined in Orkney and Klerksdorp; uranium in Klerksdorp, Platinum in Rustenburg and Brits and diamonds in Lichtenburg, Christiana and Bloemhof. The northern and western parts of the province have many sheep farms and cattle and game ranches. The eastern and southern parts are crop-growing regions that produce maize (corn), sunflowers, tobacco, cotton and citrus fruits. People in these regions are employed in farms and make a living out of it.

3.5 RESEARCH DESIGN

A descriptive and quantitative research design was used in this study. Bless and Higson-Smith (2000) define such an approach as a study concerned about the condition that exists, processes that are prevailing, developments that are on-going and trends that are developing.

This study focuses on entrepreneurial activities in homestead food gardening and irrigated food farmers in the North West province.

3.6 RESEARCH POPULATION

The population of the study consists of all households in the North West province engaged in home gardening and irrigation crop farming. The population was identified through extension officers who work with the farmers in the study areas and the personal visited by the researcher.

3.7 SAMPLING AND SAMPLE SIZE

The Department of Agriculture and Rural Development (DARD) maintains that smallholder homestead food gardening and irrigation crop farming in the North-West Province are concentrated in the Greater Taung local municipality (Dr Ruth Segomotsi Mompati District Municipality), Ramotshere Moiloa local municipality (Ngaka Modiri Molema District Municipality), Moses Kotane local municipality (Dr Kenneth Kaunda District Municipality) and Ventersdorp Local municipality (Bojanala Platinum District Municipality). Due to the lack of a proper list for smallholder homestead food gardening and irrigation crop farmers, a large sample size technique of $n \geq 30$ (Kerlinger and Lee, 2000) was used to select 40 farmers from each of the locations to obtain a total sample size of 160.

3.8 DATA COLLECTION

Data was collected from primary sources based on the objectives of the study. Face-to-face interviews were conducted with farmers and group discussions held with gardeners in order to gather data from interviewees and participants. During the process, gardeners were informed of the objectives of the study. Gardeners were given time to complete the questionnaire which was divided into different sections as follows:

Section A sought information on personal characteristics- respondents were asked to indicate their race, gender, age, farming experience, marital status, level of education, religious beliefs, household size, number of adults and children residing in the same household, size of homestead food garden, number of household members active in homestead gardening and irrigation crop farming.

Section B elicited information on the uses of crops grown. Respondents were asked to specify if they use the crops grown for household consumption, sales, livestock consumption, gifts and buttering.

Section C covered marketing activities among home gardening and irrigation crop farmers. Respondents were asked to identify their marketing outlets from community, schools, tuck shops, clinics, Pick and Pay, Choppiest, Shoprite, hospices, pension pay points and farmers' markets.

Section D requested respondents to indicate different entrepreneurial activities engaged in. The dependent variable was entrepreneurial activities to measure entrepreneurial activities. A list of forty four entrepreneurial activities was provided for respondents to indicate the activities they carry out as shown in Table 1 below.

Table 1: Entrepreneurial activities carried out by respondents

Entrepreneurial activities	Yes	No
Product design		
Distribution/sales/service		
Manufacture new products		
Promotion		
Obtaining resources		
Research and development		
Protecting intellectual property		
Obtaining raw materials		
Identifying a market opportunity		
Drive and energy		
Self-confidence		
High initiative and personal responsibility		
Internal locus of control		
Tolerance of ambiguity		
Low fear of failure		
Moderate risk taking		
Long-term involvement		
Money as a measure not merely an end		
Use of feedback		
Continuous pragmatic problem-solving		
Self-imposed standards		
Clear goal setting		
High need for achievement		

Self-authority		
Independent thinkers		
Intuitive and resourceful working style		
Business failure is personal failure		
Belief in the ability to control outcomes		
Risk takers		
Self-motivated		
Dissatisfaction with present status of achievement		
Work experience		
Life path interruption		
Invention/ creativity		
Technology changes		
Change in property		
New capital		
Unique employees		
Perceive and recognize a fit		
Secure resources		
Secure markets		
Employ and develop capabilities		
Perceiving opportunity of un-met market need		
Perceiving opportunity of under-deployed resources		

Section F sought information from respondents on constraints to entrepreneurial activities. Farmers were requested to illustrate the constraints to entrepreneurial activities from marketing, financial and production constraints.

3.9 METHOD OF DATA ANALYSIS

Data was sorted and analysed using the Statistical Package for Social Sciences (SPSS) version 21.0. Descriptive statistics such as frequency distribution and percentages were used to describe personal characteristics of respondents. Multiple regression analysis was used to isolate the determinant of entrepreneurial activities among farmers.

A total score was obtained from the list of entrepreneurial activities as indicated by the farmers and the total score for each farmer was used as the dependent variable. The variables in this study included the personal characteristics of homestead food gardening and irrigated crop farmers and their production characteristics and indices. The relationship between entrepreneurial activities and the independent variables was estimated using a regression model.

Model specification

$$Y = f(X_1, X_2, \dots, X_{16} + e) \dots\dots\dots 1$$

Y= Entrepreneurial activities

X_1 = Age

X_2 = Gender

X_3 = Marital status

X_4 = Education level

X_5 = Household size

X_6 = Household head

X_7 = No of dependants

X_8 = Income

X_9 = Access to financial capital

X_{10} = Access to human capital

X_{11} = Access to physical capital

X_{12} = Access to natural capital

X_{13} = Socio-economic status

X_{14} = Tenure status

X_{15} = Aggregate production

X_{16} = Off farm activities

X_{17} = Irrigation technology

3.10 Summary of chapter

The chapter has presented the study area, described the study area, economic activities, the research design, research population, sampling and sample size, data collection, method of data analysis and entrepreneurial activities carried out by respondents involved in the study. The next chapter presents the results and the discussion.

CHAPTER FOUR

4.0 RESULTS AND DISCUSSION

4.1 INTRODUCTION

This chapter presents the results of the study. The data collected focused on demographic characteristics, sources of water for domestic and irrigation, employment status and income levels of farmers. Furthermore, information was sought on the type of land ownership, type of cropping system of respondents, accessibility of information for smallholder homestead farmers and irrigation crop farmers, method of irrigation practised in homestead gardens and crop fields, resources used in homestead activities and activities carried out by smallholder farmers.

Moreover, it enumerated the impact of homestead food gardening and irrigation crop farming on the livelihood of farmers, constraints faced by smallholder homestead food gardeners and irrigation crop farmers as well as entrepreneurial activities among homestead food gardeners and irrigation crop farmers.

4.2 DEMOGRAPHIC CHARACTERISTICS OF HOMESTEAD FOOD GARDENS AND IRRIGATION CROP FARMERS

Table 2 presents the race distribution of respondents involved in the study. All the respondents sampled were blacks. Smallholder agriculture is found in a wide range of locations, including “deep rural areas” of the former homelands. Production may take place in gardens, demarcated fields or open range lands. It is highly differentiated by race, class and gender, with large numbers of very poor blacks producing mainly for household consumption. As in the rest of the country, only a small proportion of this land is suitable for arable farming with only miscue area under irrigation (Lahiff and Cousins, 2005).

The gender distribution of respondents is presented in Table 2. The Table shows that 51.3% are female while 48.8% are male. The household head is the one who makes the decisions and coordinates activities of the household (Pote, 2008). The characteristics of household heads are important as they define how the whole household operates. Hjorts (2005) points out that compared to men, women, especially those from small and marginal farming families perform over 60% of on-farm activities in sub-Saharan Africa and constitute a major driving force in the economic and social fabric of rural South Africa with major responsibilities in agriculture and non-agricultural business enterprises.

From the age distribution presented in Table 2, 25% of farmers were between 30-40 years, 25% were 40-50 years, 25.7% were 51-60 years and 19.5% were above 60 years. Age is one of the most important factors pertaining to the individual's personality make up, since the needs and the way in which an individual thinks are closely related to age. According to Romuld and Sandham (1996), young people are more adaptable and willing than older people to try out new innovations since old people believe in their old cultural way of doing their things. However, Hofferth (2003) argues that older people have better experiences in agricultural activities than younger people in that they know the social and physical environment better than younger people.

Furthermore, Table 2 shows the farming experience of respondents. Forty percent of farmers had less than 10 years experience in farming, 28.8% had 10-15 years and 20.8% farmers had 16-20 years experience. According to Muchara (2011), farming experience plays a major role in the productivity of a farmer. Farming experience also plays a vital role in determining when to expect a lower yield and how to prevent such cases. In farming, experience has a positive impact on successful farming (Mbusi, 2013).

Table 2 also presents the marital status of respondents with 46.9 % married, 36.3% single, and 12.5% widowed and 4.4% divorced. Marital status indicates the responsibility level based on the analysis by Zenda (2002) who maintains that married people are able to share household activities.

The educational level of respondents is also presented in Table 2. The Table reveals that most farmers had formal education with 48.1% having secondary level of education, 41.3 % primary level of education, 9.4% and tertiary 1.3%. Education is an important and enabling tool in imparting knowledge and skills that enable individuals to function as economic change agents in their society (Todaro, 1997).

All respondents involved in the study are Christians. Table 2 shows the household size distribution of respondents in the study. 85% have 1-3 adults, followed by 13.8% having 4-7 adults, 0.6% having more than 7 adults. Cherdchichai and Otsuka (2006) found that household size, number of household members and working members capture the quantity of human capital and have important practical implications for labour availability which acts as the basis for a household to decide whether or not to practise in different activities. A larger family size means that a variety of labour capacity is available in the form of young, middle-aged and elderly members (Hayers et al 1997).

The number of children among respondents is shown in Table 2. Forty five percent of the households had 1-3 children, 49.4% had 4-7 children and 5.6% were households with more than 7 children. According to Osewa *et al.*, (2013), children are an added labour advantage for increased agricultural productivity because they do the bulk of the farm work. A bigger number of children are an indication of family wealth in rural areas.

The largest number of dependants in this study is 7 persons and the lowest is 1 person with an average of 3 persons per household. The frequency distribution of dependants is shown in Table 2.

Table 2 shows the farm size of homestead food gardens among respondents. 80.6% of respondents had farm size of 0.1-1 ha, 18.8% had 1.1-2 ha and less than 1% had 2.1-3 ha. In terms of the number of household members active in homestead gardening, 78% of households had 1-3 persons and 21.3% had 4-7 persons. Similarly, 82.5% of households had 1-3 persons active in irrigation crop farming and 17.5% had 4-7 persons active in irrigation crop farming.

Table 2: Personal characteristics of homestead food gardeners and irrigation crop farmers

Variables	Frequency (percentage)
Gender of respondents	
Male	78 (48.8)
Female	82 (51.3)
Age of respondents	
Less than 30 years	7 (4.4)
30-40 years	41 (25.7)
41-50 years	40 (25)
51-60 years	41 (25.7)
Above 60 years	31 (19.5)
Farming experience of respondents	
Less than 10 years	64 (40)
10 to 15 years	46 (28.8)
16 to 20 years	33 (20.8)
Above 20 years	17 (10.7)
Marital status of respondents	
Single	58 (36.3)
Married	75 (46.9)
Divorced	7 (4.4)
Widowed	20 (12.5)
Educational level of respondents	

Abet	15 (9.4)
Primary	66 (41.3)
Secondary	77 (48.1)
Tertiary	2 (1.3)
None	0 (0)
Household size	
Number of adults	
1 to 3	137 (85.6)
4 to 7	22 (13.8)
More than 7	1 (0.6)
Number of children	
1 to 3	72 (45)
4 to 7	79 (49.4)
More than 7	9 (5.6)
Number of dependants	
1 to 3	84 (52.5)
4 to 7	62 (38.8)
More than 7	14 (8.8)
Size of homestead food garden	
0.1 to 1	129 (80.6)
1.1 to 2	30 (18.8)
2.1 to 3	1 (0.6)
Household members active in homestead gardening	
1 to 3	126 (78.8)
4 to 7	34 (21.3)
Household members active in irrigation crop farming	
1 to 3	132 (82.5)
4 to 7	28 (17.5)

*Figures in parentheses are percentages

4.3 SOURCES OF WATER, EMPLOYMENT STATUS AND INCOME AMONG FARMERS

Table 3 shows the distribution of respondents based on the sources of water for domestic use. Tap water is the most common source of water for domestic use (79.4%), this is followed by rain water (38.8%) and all farmers indicated that they did not have unprotected wells and river as the sources of water for domestic use. Ahiamble, Engel and Vernort (2012) found that with reliable water resource, the amount of time and energy involved in fetching water for daily household uses can be reduced and thus invested in other activities.

Table 3 presents the distribution of respondents based on the sources of water for irrigation. 61% of farmers have boreholes as their source of water for irrigation, followed by tap water (45.6) and rain water harvesting (29.4). Those who indicated that they do not use wells and

springs as their sources of water for irrigation are 99.4%. According to the Environment Protection Agency (2012), irrigation makes agriculture possible in areas previously unsuitable for intensive crop production, irrigation transports water to crops to increase yields, keep crops cool under excessive heat to conditions and prevent freezing.

The employment status of respondents in Table 3 shows that 85% were not employed, 8.8% were self employed and 5% were employed farmers.

Table 3 also shows the distribution of respondents based on the sources of income. 55% get their income through remittances, 44.4% through wages, 28.8% non-farm income. For the farmer, total income is the money derived from remittances, savings, wages, non-farm income, family business and pensions. The wellbeing of farm families is no longer solely dependent on the outcome of farming activities. Agricultural activity is therefore one of the many possible sources of employment and income for farm households across the world (Kirsten and Moldenhauer, 2006).

Table 3: Sources of water, employment and income among farmers

Variables	Frequency (percentage)	
Sources of water for domestic use		
	No	Yes
Tap	33 (20.6)*	127 (79.4)*
Protected well	159 (99.4)	1 (0.6)
Rain water tanks	98 (61.3)	62 (38.8)
Tap, river and rain water	117 (73.1)	43 (26.9)
Sources of water for irrigation		
Tap	87 (54.4)	73 (45.6)
well	159 (99.4)	1 (0.6)
Rain water tanks	139 (86.9)	21 (13.1)
Rain water harvesting	113 (70.6)	47 (29.4)
Spring	159 (99.4)	1 (0.6)
Borehole	61 (38.1)	99 (61.9)
Dam	119 (74.4)	41 (25.6)
Employment status		
Employed	152 (95)	8 (5)
Unemployed	24 (15)	136 (85)
Self-employed	146 (91.3)	14 (8.8)
Student	158 (98.8)	2 (1.3)
Source of income among farmers		
Wages	89 (55.6)	71 (44.4)
Pension	124 (77.5)	36 (22.5)
Remittances	72 (45)	88 (55)

Family business	159 (99.4)	1 (0.6)
Non-farm income	114 (71.3)	46 (28.8)
Other	159 (99.4)	1 (0.6)

*Figures in parentheses are percentages

4.4 LAND OWNERSHIP AND CROPPING SYSTEM AMONG RESPONDENTS

Table 4 shows the distribution of respondents based on land ownership. 50% are farming on communal land, 49.4% on personal land, and 0.6% on leased land. Smallholder farmers are among the poorest South Africans, most have access to residential land only. A minority has access to grazing land for their livestock or to arable land for cultivation and may be required to provide their labour in return for the land (Hall. 2003).

Table 4 equally shows the distribution of respondents based on the types of cropping system practised by smallholder food gardeners and irrigation crop farmers. 61.9% practised mixed cropping, 26.3% practise mono cropping, 1.9% practise double cropping. The term cropping system refers to the crops and crop sequences and the management techniques used on a particular field over a period of years.

Table 4: Types of land ownership and cropping system among respondents

Variables	Frequency (percentage)
Land ownership of respondents	
Own land	79 (49.4)*
Communal land	80 (50)
Leased land	1 (0.6)
Types of cropping system	
None	16 (10)
Mono	42 (26.3)
Double cropping	3 (1.9)
Multiple cropping	0(0)
Mixed cropping	99 (61.9)
Crop livestock integration	0 (0)

*Figures in parentheses are percentages

4.5 ACCESSIBILITY TO INFORMATION AMONG SMALLHOLDER HOMESTEAD FARMERS AND IRRIGATION CROP FARMERS

Table 5 presents the distribution of respondents based on sources of information. 98% of farmers receive extension services, 98.1% have access information through the radio, 95% through Imbizo, 92.5% through the television and 73.8% through newspapers. However, 96.3% of farmers do not access information through the computer, internet with 94.4%, phone with 71.3% and least is magazine with 70.6%. According to Obidike (2011), rural farmers lack access to knowledge and information that would help them achieve maximum survival. Munyua (2000) and Blait (1996) maintain that the least expensive input for improved rural agricultural development is adequate access to knowledge and information in areas of technologies and early warning systems (draught, pests and diseases.), improved seedlings, fertilizers and credit market price. There are short comings of traditional print and library based methods (Van and Fortier, 2003) of providing such agricultural information to rural farmers who are generally illiterate and relatively remote from formal sources of information (e.g. extension stations and libraries etc).

Table 5: Source of information among smallholder homestead food gardeners and irrigation crop farmers

Variables	Yes	No
Extension officer	158 (98.8)*	2 (1.3)
Sources of information		
Television	148 (92.5)	12 (7.5)
Radio	157 (98.1)	3 (1.9)
Phone	46 (28.8)	114 (71.3)
Internet	9 (5.6)	151 (94.4)
Newspaper	118 (73.8)	42 (26.3)
Magazine	47 (29.4)	113 (70.6)
Computer	6 (3.8)	154 (96.3)
Imbizo	152 (95)	8 (5)

4.6 FARM CHARECTARISTICS AMONG SMALLHOLDER HOMESTEAD FARMERS AND IRRIGATION CROP FARMERS

Table 6 also shows the distribution of respondents based on the use of crops grown. 99.4% of the crops grown are for household consumption, 98.1% for sale and 27.5% for gifts. Households make choices on how much to store and how much to sell depending on the market price, their own consumption needs, storage facilities and their needs for immediate cash. Smallholder irrigation can increase and diversify the livelihood activity of plant production resulting in improved livelihood outcomes, either directly in the form of food or income for plot holders, or indirectly by providing full or partial livelihood to people who provide goods and services in support of irrigated agriculture (Backerberg *et al.*, 2010).

Table 6 also shows the distribution of respondents based on marketing outlets. 99.4% of farmers market their products to the community, 98.1% use pension pay points, 79.4% use tuck shops and 77.5% go to farmers' markets.

Table 6 further presents the distribution of respondents based on their willingness to expand their plots. 96.3% are willing to increase the number of crops produced while 95.6% of farmers are willing to expand, increase the size of the plot and have the potential to expand.

Table 6: Farm related characteristics among homestead food gardeners and irrigation crop farmers

Variables	Yes	No
Uses of crops grown		
Household consumption	159 (99.4)	1 (0.6)
Sales	157 (98.1)	3 (1.9)
Livestock consumption	20 (12.5)	140 (87.5)
Gifts	44 (27.5)	116 (72.5)
Buttering	16 (10)	144 (90)
Marketing outlets		
Community	159 (99.4)	1 (0.6)
Schools	60 (37.5)	100 (62.5)
Tuck shops	127 (79.4)	33 (20.6)
Clinics	26 (16.3)	134 (83.7)
Pick and pay	1 (0.6)	159 (99.4)
Choppies	2 (1.3)	158 (98.7)
Hospices	110 (68.7)	50 (31.3)
Pension pay points	157 (98.1)	3 (1.9)

Farmers market	124 (77.5)	36 (22.5)
Expansion plot		
Are you willing to expand?	153 (95.6)	7 (4.4)
Do you have the potential to expand?	153 (95.6)	7 (4.4)
Are you willing to increase the size of the plot?	153 (95.6)	7 (4.4)
Are you willing to increase the number of plots in different locations?	92 (57.6)	68 (42.5)
Are you willing to increase the number of crops produced?	154 (96.3)	6 (3.8)

*Figures in parentheses are percentages

4.7 METHODS OF IRRIGATION, RESOURCE USE AND HOMESTEAD ACTIVITIES AMONG RESPONDENTS

In Table 7, the most used methods of irrigation by farmers in the North West Province are furrow irrigation (73.1%), basin irrigation (33.8%), bucket irrigation (31.3%) and sprinkler (25.6%) as well as flood irrigation (0.6%). Reinder (2011) states that irrigated agriculture play a major role in the livelihoods of nations all over the world. South Africa is no exception with irrigation agriculture making the largest use of runoffs. The different irrigation systems vary in terms of individual components, cost and performance and generally, can be classified into three groups: flood irrigation system, mobile irrigation system and static irrigation system.

Resources used in homestead activities of respondents are presented in Table 7. The study revealed that all farmers use garden fork, knap sack sprayer, 99.4% use scotch cart, 80% plough and harrow and 68.8% use tractors. 99.4% of respondents indicated that they do not have spades, rakes and wheel barrows, 92.5% said that they do not have hand hoes and 84.4%

do not have shovels. According to FAO (1997), farm resources generally fall into two broad categories; the first category is forced resources that provide services over a number of years or at least over a period longer than the production cycle of short-term (seasonal, annual) crop or livestock enterprises. The most common examples of this are land, machinery and irrigation system. Accessibility to farm implements such as tractors, plough and hoes are expected to influence the total output and marketing, hence farmers who own planting implements stand a better chance of using all of the land available to them (Jari, 2009). In addition, ownership of planting implements positively affects the time of planting. A farmer who owns farm implements is more likely to plant on time. This may result in larger output levels (Mbusi, 2013).

Table 7 shows the distribution of farming activities carried out by. All farmers carry out irrigation, harvesting (98.8%), planting (95.6%), land clearing, manure application, washing and trimming (94.4%). Farmers did not agree to practise, water control management (90.6%), fertilizer application (79.4%), nursery (72.5%), ridging (58.8%) and (53.1%) staking.

Table 7: Resource management pattern of homestead food gardening and irrigation crop farmers

Variables	Frequency (percentage)	
Method of irrigation		
	Yes	No
Bucket	50 (31.3)*	110 (68.8)
Sprinkler	41 (25.6)	119 (74.4)
Furrow	117 (73.1)	43 (26.9)
Flood	1 (0.6)	159 (99.4)
Basin	54 (33.8)	106 (66.3)
Resources used in homestead activities		
Trailer	51 (31.9)	109 (68.1)
Scotch cart	1 (0.6)	159 (99.4)
Tractor	50 (31.3)	110 (68.8)
Vehicle	19 (11.9)	141 (88.1)
Hand hoes	148 (92.5)	12 (7.5)
Shovels	135 (84.4)	25 (15.6)
Plough	31 (19.4)	129 (80)
Harrow	32 (20)	128 (80)
Wheel barrow	159 (99.4)	1 (0.6)
Sledge	100 (62.5)	60 (37.5)
Sickle	118 (73.8)	42 (26.3)

Spade	159 (99.4)	1 (0.6)
Rake	159 (99.4)	1 (0.6)
Farming activities		
Land clearing	151 (94.4)	9 (5.6)
Ploughing	114 (71.2)	46 (28.8)
Harrowing	120 (75)	40 (25)
Nursery	44 (27.5)	116 (72.5)
Transplanting	88 (55)	72 (45)
Staking	75 (46.9)	85 (53.1)
Planting	153 (95.6)	7 (4.4)
Irrigating	160 (100)	0(0)
Ridging	66 (43.2)	94 (58.8)
Weeding	128 (80)	32 (20)
Fertilizer application	33 (20.6)	127 (79.4)
Manure application	151 (94.4)	9 (5.6)
Water control and management	15 (9.4)	145 (90.6)
Irrigation water maintenance	133 (83.1)	27 (16.9)
Spraying	125 (78.1)	35 (21.9)
Harvesting	158 (98.8)	2 (1.3)
Washing	159 (99.4)	1 (0.6)
Trimming	159 (99.4)	1 (0.6)

*Figures in parentheses are percentages

4.8 ACCESS TO LIVELIHOOD CAPITAL ASSETS AMONG HOMESTEAD FOOD GARDENING AND IRRIGATION CROP FARMERS

Livelihood capital was operationalised in terms of access to different indicators of the five livelihood capital defined by DHD (2001). Table 8 shows access to financial capital. The results show that funding is mostly accessed through government subsidies (47.5%), personal savings (42.5%), regular remittance (33.1%) and relatives (28.1%). According to Robbins, Bikane, Ferris, Klein, Okoboi and Wandsehneider (2004), collective activity also helps farmers to obtain credit. They may be able to borrow money to buy inputs and improve their farms which in turn could increase their income levels.

Table 8 also shows the indicators of human capital among respondents. Knowledge in farming (75%), water management skills (75%), knowledge of vegetable production (71.3%) and training (61.3%). There is lack of knowledge in crop protection among respondents

(56.4%), financial management (57.5%), record keeping (55%) and vocational training (46.9%).

Based on the results of the study as presented in Table 8, physical capital of respondents consists of transport, water supply canal, markets, road accessibility, electricity and storage. 78.1% have road accessibility and markets and 72.5% access to electricity. Most farmers indicated that they do not have water supply canal (88%), storage (63.8%) and transport (61.9%). Market is adequately high with 21.9% and road accessibility (22.5%). The lowest are road accessibility and electricity with 51.3%, 44.4% markets and 33.8% transport. There was no response in adequacy on the following: storage (61.9%), transport (60%) and 58.8% supply canal. Physical capital assets consist of roads, tools, irrigation canals, buildings and machines. Physical capital enhances the construction and building of livelihoods. Natural capital on its own is not sufficient to enhance effective livelihood outcome and must be complemented by the use of physical capital (Gidi, 2013).

Table 8 further shows the natural capital of respondents that impact on the livelihood of smallholder farmers. Water (90%), land tenure (86.3%) and 82.5% land. It is shown that there is no trust relationship (51.3%), biodiversity (65%) and land tenure (33.8%). In terms of adequacy, land tenure is high (32.5%), water use right (31.3%), 28.8% environment and water is low in adequacy (55.6%), 54.4% land, and 48.1% environment. There was no response in biodiversity (63.1%), 49.4% trust relationship and 35.6% land tenure. Natural capital as shown in Table 8 consists of land, water, environment, biodiversity, trust relationship, water use right and land tenure. According to ICID (2007), natural capital refers to the natural occurring, as opposed to mandate, phenomenon or products. They are goods and services that relate to the natural environment rather than the products of the manufacturing process. The significance of natural capital rests on the fact that without them, production may not take place in the first place.

Table 8 also presents the social capital of respondents. Farmers are more interested in relationship of trust (60.6%), 49.4% access to wider institutions of society and farmers did not agree on networks (66.9%) and group membership (59.1%). Farmers' adequacy is high on relationship of trust (23.8%), 35% access to wider institutions of society and low at relationship of trust and group membership as well as access to wider institutions (26.9%). There was no response to networks (72.5%), 61.9% group membership and 50% access to wider institutions of society. Interest in human development naturally calls for a deeper

investigation into the social dimension 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 (Op-Ed published in The Wall Street Journal on 29 September 2007). Bailey (2007) argues “intangible wealth” has the same character and features as social capital. It is a 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 (Kibirige, 2013).

Table 8: Farmers access to livelihood capital assets

Table 8: Farmers access to livelihood capital assets					
Variables	Frequency (percentage)				
Impact of homestead food gardening and irrigation crop farming on the livelihood of smallholder farmers					
	Availability		Adequacy		
	Yes	No	No response	High	Low
Financial capital					
Banks	24 (15)*	136 (81)	131 (81)	7 (4.4)	22 (13.8)
Cooperatives	18 (11.30)	142 (88.8)	141 (88.1)	4 (2.5)	15 (9.4)
Money lenders	30 (18.8)	130 (81.3)	131 (81.9)	4 (2.5)	25 (15.6)
Savings	48 (11.2)	112 (70)	118 (73.8)	11 (6.9)	31 (19.4)
Regular remittance	53 (33.1)	107 (66.9)	105 (65.5)	4 (2.5)	51 (31.9)
Pension	30 (18.8)	130 (81.3)	128 (80)	3 (1.9)	29 (18.1)
Relatives	45 (28.1)	115 (71.9)	118 (73.8)	6 (3.8)	36 (22.5)
Personal savings	68 (42.5)	92 (57.5)	98 (61.3)	13 (8.1)	49 (30.6)
Contractors	27 (16.9)	133 (86.9)	139 (86.9)	3 (1.9)	18 (11.3)
Government subsidies	76 (47.5)	84 (54.4)	87 (54.4)	33 (20.6)	40 (25)
Human capital					
Training	98 (61.3)	62 (38.8)	80 (50)	48 (30)	32 (20)
Vocational training	85 (53.1)	75 (46.9)	87 (54.4)	33 (20.6)	40 (25)
Extension services	94 (58.8)	66 (41.3)	66 (41.3)	43 (26.9)	51 (31.9)
Skills training	90 (56.3)	70 (43.8)	70 (43.8)	46 (28.8)	44 (27.5)
Knowledge of gardening	121 (75.6)	39 (24.4)	50 (31.3)	76 (47.5)	34 (21.3)
Knowledge of vegetable production	114 (71.3)	46 (28.8)	39 (24.4)	76 (47.5)	45 (28.1)
Record keeping	72 (45)	88 (55)	90 (56.3)	24 (15)	46 (28.8)
Water management	120 (75)	40 (25)	56 (35)	48 (30)	56 (35)
Equipment handling	95 (59.4)	65 (40.6)	57 (35.6)	45 (28.1)	58 (36.3)
Financial management	68 (41.3)	92 (57.5)	100 (52.5)	21 (26.3)	39 (21.3)
Soil management	93 (58.1)	67 (41.9)	84 (52.5)	22 (26.3)	34 (21.3)
Crop protection	71 (44.4)	89 (56.4)	82 (51.3)	27 (16.9)	51 (31.9)
Physical capital					
Transport	61 (38.1)	99 (61.9)	96 (60)	10 (6.3)	54 (33.8)
Water supply canal	72 (45)	88 (88)	94 (58.8)	14 (8.8)	52 (32.5)

Markets	123 (78.1)	37 (23.1)	54 (33.8)	35 (21.9)	71 (44.4)
Road accessibility	125 (78.1)	35 (21.9)	42 (26.3)	36 (22.5)	82 (51.3)
Electricity	116 (72.5)	44 (27.5)	55 (34.4)	23 (14.4)	82 (51.3)
Storage	58 (36.4)	102 (63.8)	99 (61.9)	17 (10.6)	44 (27.5)
Natural capital					
Land	132(82.5)	28 (17.5)	34 (21.3)	39 (24.4)	87 (54.4)
Water	144 (90)	16 (10)	28 (17.5)	43 (26.9)	89 (55.6)
Environment	130 (81.3)	30 (18.8)	37 (23.1)	46 (28.8)	77 (48.1)
Biodiversity	56 (35)	104 (65)	101 (63.1)	21 (13.1)	38 (23.8)
Trust relationship	78 (48.8)	82 (51.3)	79 (49.4)	20 (12.2)	61 (38.1)
Water use right	110 (68.8)	50 (31.3)	49 (30.6)	50 (31.3)	61 (38.1)
Land tenure	106 (86.3)	54 (33.8)	57 (35.6)	52 (32.5)	51 (31.9)
Social capital					
Networks	53 (33.1)	107 (66.9)	116(72.5)	24(15)	20(12.5)
Group membership	65 (40.1)	95 (59.1)	99(61.9)	18(11.3)	43(26.9)
Relationship of trust	97 (60.6)	63 (39.4)	66(41.3)	38(23.8)	56(35)
Access to wider institutions of society	79 (49.4)	81 (50.6)	81(50.6)	36(22.5)	43(26.9)

*Figures in parentheses are percentages

4.9 POSITIVE PSYCHOLOGICAL, OPTIMISM AND RESILIENCE OF THE RESPONDENTS

The results are presented in Table 9. A positive psychology of respondents indicates that farmers have confidence (81.9%), individual ability to mobilise stands at 78.8% and low on individual ability to motivate (32.5 %), 20.6% strong positive relationship to work related performance and 50.6% level of adequacy is high on strong positive relationship to work related performance, 50% confidence, but low on individual ability to mobilise (28.1%) and self efficacy 30%. According to Sudharani (2010), the positive psychological capital related concepts essential for a successful entrepreneur may include self-confidence, confronting uncertainty (optimism), hope and perseverance. Positive psychological- capital is simply defined as “who you are” (Luthans, Luthans and Luthans, 2004). To be more specific, the term can be defined as the positive and developmental state of an individual as characterised by high confidence (self-efficacy), optimism and resilience.

Table 9 shows optimism of respondent. 88.1% of farmers are goal getters and talented, 59.4% not easily fed up, 66.3% not easily discouraged and 60% motivated. Their level of adequacy on those who are talented is 42.5% high, goal getters (46.3%) and 15% low on giving up, easily fed up (18.1%). This can be described as individuals' future expectation and optimists always expect good outcomes. The concept can also be defined as a positive attribution about present success and in the future (Carver *et al.*, 2005; Luthans *et al.*, 2007).

The concept is mainly based on the expectancy oriented value model which speculates that, unless there is a valued goal, no actions occur. The opposite of optimism is pessimism, and pessimists think negative about succeeding now and in the future. Optimists have a sense of confidence and persistence in confronting tough situations (Cover *et al.*, 2008). Moreover, optimists interpret bad events as being only temporary while pessimists interpret bad events as being permanent (Kabirige, 2013).

Table 9 further points out the resilience of respondents, homestead food gardening and irrigation crop farming on the livelihood of smallholder farmers. Farmers have the ability to improvise stands at (88.1%) while 78.1% shows flexibility in adjustment. However, some farmers responded negatively on the ability to adapt to significant change (37.5%) and 32.5% deep believe. It is shown that adequacy is high on ability to adapt to significant change (64.4%), 62.5% deep belief and low in flexibility on adjustment (40.6%) and ability to improvise (33.1%). According to Ryan and Calbrano (2013), the concept of reliance can be defined as the ability to maintain or regain positive levels of functioning or bouncing back despite adversity and even beyond in order to attain success. Resilience can also be defined as a positive way of coping with danger or distress (Kabirige, 2013).

Table 9: Farmers orientation towards self employment

Variables	Frequency (percentage)				
Impact of homestead food gardening and irrigation crop farming on the livelihood of smallholder farmers					
	Availability		Adequacy		
	Yes	No	No response	High	Low
Positive psychological capital					
Confidence	131(81.9)*	29 (18.9)	41(25.6)	80(50)	39(24.4)
Self-efficacy			41(25.6)	71(44.4)	48(30)
Individuals' ability to mobilise	126 (78.8)	34 (21.3)	43(26.9)	72(45)	45(28.1)
Individuals' ability to motivate	108 (67.5)	52 (32.5)	46(28.8)	74(46.3)	40(25)
Strong positive relationship to work related performance	127 (79.4)	33 (20.6)	37(23.1)	81(50.6)	42(26.3)
Optimism					
Easily fed up	65 (40.6)	95(59.4)	107(66.9)	24(15)	29(18.1)
Giving up	24(15)	136(85)	125(78.1)	11(6.9)	24(15)
Easily discouraged	54(33.8)	106 (66.3)	112(70)	12(7.5)	36(22.5)
Talented	141(88.1)	19(11.3)	31(19.4)	68(42.5)	61(38.1)

Goal getter	141(88.1)	19(11.3)	31(19.4)	74(46.3)	55(34.4)
Demotivated	64(40)	96(60)	85(53.1)	35(21.9)	40 (25)
Resilience					
Flexibility in adjustment	125 (78.1)	35 (21.9)	39(24.4)	56(35)	65(40.6)
Deep belief	108(67.5)	52(32.5)	18(11.3)	100(62.5)	42(26.3)
Ability to improvise	141(88.1)	19 (11.9)	14(8.8)	93(58.1)	53(33.1)
Ability to adapt to significant change	100(62.5)	60 (37.5)	17(10.6)	103(64.4)	40(25)
Ability to resist stress	103(64.4)	57(36.6)	17(10.6)	95(59.4)	47(29.4)

*Figures in parentheses are percentages

4.10 CONSTRAINTS FACED BY SMALLHOLDER HOMESTEAD FOOD GARDENERS AND IRRIGATION CROP FARMERS

Constraints were categorised into market, financial and production. Several markets were developed for each of these categories. Table 10 shows the marketing constraints of respondents. Most respondents (99.4%) indicated that processing is the prominent constraint, 98.8% transport and lack of marketing skills (93.1%). Only 6.9 % said no to packaging, 5% market information and 2.5% market price. Smallholder and emerging farmers face difficulties in accessing markets, and as a result, markets do not serve their interests. In less developed rural areas of South Africa, smallholder and emerging farmers find it difficult to participate in commercial markets due to a range of technical and institutional constraints. Factors such as poor infrastructure, lack of market transport, dearth of market information, insufficient expertise on, and use of grades and standards, inability to conclude contractual agreements and poor organisational support have led to inefficient use of markets, hence results in commercialisation bottlenecks. Furthermore, smallholder farmers lack vertical linkages in the marketing channels, which result in their exclusion from the use of formal markets (Fenwick and Lyne, 1999; Makhura, 2001; Delgado, 1999; Wyne and Lyne, 2003).

Table 10 also shows the distribution of respondents based on financial constraints. Lack of access to financial institutions, volatile interest rates and low profit viability stand at 99.4% while lack of financial surety and lack of financial skills represent 98.8%. According to Ugwumba and Omojola (2013), farmers' need of credit in Nigeria is warranted by numerous problems faced by agriculture in the country such as inadequate funding, scarcity and high cost of inputs, underdeveloped marketing systems and poor infrastructural facilities (Fakayode, 2008). Farmers' access to credit is dependent on: location of banks (Oji, 2005); farmers' attitude with regard to loan defaults (Adejebi and Adobatele, 2008; Adegbite, 2009);

high interest rate and short-term nature of the loans (Philip *et al.*, 2009); and the cost of credit (interest rate charged, availability of collateral and dearth of information), (Okojie, 2010). Access to credit could be influenced positively and significantly by farmers' experience, educational level and amount spent on farm inputs (Mesike and Okoh, 2008). Whole net farm income is determined by age, educational level, cost inputs and farm size (Ugwumba and Okwuanaso, 2012).

Table 10 further presents the distribution of production constraints of respondents. Most farmers answered yes to high input cost and climate change (99.4%) and 0.6% did not agree respectively. Pests seem to be one of the major constraints faced by farmers (98.7%) and only 1.3% did not agree. High cost of implements represents (94.4%) and 5.6% did not agree. According to Gidi (2013), agricultural production consists of the crop output including harvested vegetables by 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 household 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 case of inelastic demand (Foster, 1992).

Table 10: Constraints faced by smallholder homestead food gardeners and irrigation crop farmers

	Yes	No
Marketing constraints		
Market information	152(95)*	8(5)
Market price	156(97.5)	4(2.5)
Transportation	158(98.8)	2(1.3)
Processing	159(99.4)	1(0.6)
Preservation	156(97.6)	4(2.5)
Packaging	149(93.1)	11(6.9)
Lack of marketing skills	157(98.1)	3(1.9)
Financial constraints		
Lack of access to financial institutions	159(99.4)	1(0.6)
Lack of financial surety	158(98.8)	2(1.3)
Volatile interest rates	159(99.4)	1(0.6)
Lack of income	144(90)	16(10)
Low profit viability	159(99.4)	1(0.6)
Lack of financial skills	158(98.8)	2(1.3)
Production constraints		
High input cost	159(99.4)	1(0.6)
High implement cost	151(94.4)	9(5.6)

Lack of production skills	147(91.9)	13(8.1)
Lack of production knowledge	105(65.6)	55(34.4)
Climate change	159(99.4)	1(0.6)
Shortage of water	147(91.9)	13(8.1)
Pests	158(98.7)	2(1.3)
Water availability	147(91.9)	13(8.1)

* Figures in parentheses are percentages

4.11 ENTREPRENEURIAL ACTIVITIES AMONG HOMESTEAD FOOD GARDENERS AND IRRIGATION CROP FARMERS

Table 11 shows the distribution of respondents based on their entrepreneurial activities. Prominent activities among the farmers are self authority (80%), high need for achievement and independent thinkers (78.8%), money as a measure not merely an end and long-term involvement (77.5%), self confidence (76.3%) and high initiative and personal responsibility (74.4%). Respondents did not agree to product design (91.9%), manufacture new products (82.5%), new capital (83.8%), and 78.1% change in property and 62.4% secure new market. Rudmann (2008) states that according to the theoretical approach utilised by (Vesla, 2008), entrepreneurial skill is a rational concept which refers to the individual as well as to the activity. It describes, on the one hand, the individual who knows how to do something in business. On the other hand, it describes those tasks and activities that the individual needs to know how to do in the business context. It must be emphasised that while the concept of entrepreneurial skills tells us something about the individual, it does not tell us everything. Similarly, it tells us something about business activity but not the whole story. The concept stands for one possible way to approach entrepreneurship not the whole construct of entrepreneurship.

Table 11: Entrepreneurial activities among homestead food gardeners and irrigation crop farmers

	Yes	No
Entrepreneurial activities		
Product design	13(8.1)*	147(91.9)
Distribution / sales / service	64(40)	96(60)
Manufacture new products	28(17.5)	132(82.5)
Promotion	58(36.3)	102(63.8)
Obtaining resources	66(41.3)	94(58.8)
Research and development	55(34.4)	105(65.6)

Protecting intellectual property	49(30.6)	111(69.4)
Obtaining raw materials	57(35.6)	103(64.4)
Identifying a market opportunity	83(51.9)	77(48.1)
Drive and energy	113(70.6)	47(29.4)
Self confidence	118(76.3)	42(26.3)
High initiative and personal responsibility	119(74.4)	41(25.6)
Internal focus of control	100(62.5)	60(37.5)
Tolerance and ambiguity	108(67.5)	52(32.5)
Low fear of failure	109(68.1)	51(31.1)
Moderate risk taking	114(71.3)	45(28.8)
Long-term involvement	124(77.5)	36(22.5)
Money as a measure not merely an end	124(77.5)	36(22.5)
Use of feedback	100(62.5)	60(37.5)
Continuous pragmatic problem-solving	110(68.8)	50(31.3)
Self-imposed standards	107(66.9)	53(33.1)
Clear goal setting	115(71.9)	45(28.1)
High need for achievement	126(78.8)	34(21.3)
Self-authority	128(80)	32(20)
Independent thinkers	126(78.8)	34(21.3)
Intuitive and resourceful working style	108(67.5)	52(32.5)
Business failure is personal failure	110(68.8)	50(31.3)
Belief in the ability to control outcomes	111(69.4)	49(30.6)
Risk takers	108(67.5)	52(32.5)
Self-motivated	114(71.3)	46(28.8)
Dissatisfaction with present status of achievement	88(55)	72(45)
Work experience	98(61.3)	62(38.8)
Life path interruption	72(45)	88(55)
Invention / creativity	93(58.1)	67(41.9)
Technology changes	43(26.9)	117(73)
Change in property	35(21.9)	125(78.1)
New capital	26(16.3)	134(83.8)
Unique employees	84(52.5)	76(47.5)
Perceive and recognize a fit	68(42.5)	92(57.5)
Secure resources	72(45)	88(55)
Secure markets	60(37.5)	100(62.4)
Employ and develop capabilities	94(58.8)	66(41.3)
Perceiving opportunity of un-met market need	70(43.8)	90(56.3)
Perceiving opportunity of under-deployed resources	68(42.5)	92(57.5)

*Figures in parentheses are percentages

4.12 MULTIPLE REGRESSION ANALYSIS OF DETERMINANTS OF ENTREPRENEURIAL ACTIVITIES AMONG HOMESTEAD VEGETABLE FARMERS

The influence of socio-economic characteristics on entrepreneurial activities model was estimated using linear regression with the equation:

$$Y=f(b_0+b_1X_1 \text{ attitude} + b_2X_2 \text{ household food security} + b_3 X_3 \text{ willingness for entrepreneurship} + b_4 X_4 \text{ market outlet} + b_5X_5 \text{ social participation} + b_6X_6 \text{ household head} + b_7X_7 \text{ age} + b_8X_8$$

farming experience + b_9X_9 marital status + $b_{10} X_{10}$ education + $b_{11} X_{11}$ religion + $b_{12}X_{12}$ land ownership + $b_{13}X_{13}$ types of enterprises + $b_{14} X_{14}$ willingness for expansion + $b_{15}X_{15}$ crop expansion and the results of the estimated model is presented in Table 12.

The independent variables were significantly related with an F value of 5.21, $p < .05$. Also, an R value of 0.59 showed that there was a strong correlation between socio-economic characteristics and entrepreneurial activities. The results further predicted 35% of the variation in entrepreneurial activities. Seven out of fifteen independent variables were significant, with two variables being significant at 10% (household head and age); while five variables were significant at 5% (willingness for entrepreneurship, market outlet social participation, farming experience and types of land ownership). Significant determinants of entrepreneurial activities were entrepreneurship willingness ($t = 2.289$, $p = .024$); market outlet ($t = 2.684$, $p = .008$), social participation ($t = -2.029$, $p = .044$); household head ($t = 1.691$, $p = .093$); age ($t = -1.924$, $p = .056$); farming experience ($t = 3.189$, $p = .002$) and types of land ownership ($t = 2.166$, $p = 0.032$). These findings imply that the higher the willingness for entrepreneurship, marketing outlets, male-headed household, farming experience and personal land ownership, the higher the entrepreneurial activities among homestead vegetable farmers. However, age and social participation are inversely related to entrepreneurial activities among farmers. This implies that the older the farmers become, and the more farmers are involved in social participation, the lower the entrepreneurial activities among farmers.

Table 12: Multiple regression analysis between socio-economic characteristics and entrepreneurial activities

Model	Unstandardised coefficient		Standardised coefficient	t	sig
	B	Std. error	Beta		
(Constant)	78.413	9.678		8.102	.000
Attitude	-.663	.490	-.351	-1.352	.178
Household food security	-1.124	.776	-.535	-1.448	.150
Entrepreneurship willingness	.184	.081	.258	2.289	.024
Market outlet	1.540	.574	.969	2.684	.008
Social participation	-.990	.488	-.285	-2.029	.044
Household head	2.436	1.440	.123	1.691	.093
Age	-.171	.089	-.227	-1.924	.056
Farm experience	.445	.139	.323	3.189	.002
Marital status	.654	.946	.063	.691	.490
Education	-1.244	1.162	-.085	-1.070	.286
Religion	-.657	2.913	-.016	-.226	.822

Type of land ownership	3.743	1.728	.194	2.166	.032
Types of enterprises	.281	.824	.045	.341	.734
Willingness for expansion	-4.822	3.827	-.100	-1.260	.210
Crop expansion	-5.394	3.752	-.103	-1.437	.153
R	0.59				
R Square	0.35				
F	5.21				
P	0.00				

4.13 Summary of chapter

This chapter has presented the results of the study. It has examined the demographic characteristics of smallholder homestead food gardeners and irrigation crop farmers, the sources of water for domestic use, source of water for irrigation, employment status and source of income of farmers, the types of land ownership, types of cropping systems of respondents, accessibility of information for smallholder homestead farmers and irrigation crop farmers, farmers' participation in agricultural or social organisations, methods of irrigation practised in homestead gardens and crop fields, resource used in homestead activities and homestead activities carried out by smallholder farmers. The impact of homestead food gardening and irrigation crop farming on the livelihood of smallholder farmers, constraints faced by smallholder homestead food gardeners and irrigation crop farmers, entrepreneurial skill among homestead food gardeners and irrigation crop farmers and the influence of socio-economic characteristics and entrepreneurial activities were also discussed.

CHAPTER FIVE

5.0 SUMMARY, MAJOR FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.1 INTRODUCTION

This chapter presents a summary of the study, the key findings and conclusions based on the key finding. It also provides recommendations based on the results.

5.2 SUMMARY

The study analysed entrepreneurial activities among homestead food gardens and irrigation crop farmers in the North West province, South Africa. It determined the personal characteristics and socio-economic characteristics on entrepreneurial activities of irrigation crop farmers and their attitude towards homestead food gardening. The study further investigated the impact of homestead food gardening and irrigation crop farming on the livelihoods of smallholder farmers, entrepreneurial activities and constraints faced by smallholder homestead food gardens and irrigation crop farmers.

The population of the study comprised of homestead food gardening and irrigation crop farmers of the North West province. The study area consisted of the four districts of the North West province as follows: Bojanala, Dr Ruth Segomotsi Mompati, Dr Kenneth Kaunda and Ngaka Modiri Molema. A total sample of 160 farmers was selected and the size of each district stood at 40. A structured questionnaire was used to elicit information from respondents and divided into five sections as follows: personal characteristics of rural-dwellers engaged in home gardening, enterprise in home gardening and irrigation crop farming, farm related characteristics, entrepreneurial activities among in home gardening and irrigation crop farms, constraints faced by homestead food gardening and irrigation crop farming in their engagement in entrepreneurial activities, resource management pattern of homestead food gardening and crop irrigation farmers, farmers access to livelihood capital assets and farmers orientation towards self employment. Data collected was analysed using SPSS version 21. Frequency count, percentages, mean and standard deviations were used to describe the data, linear multiple regressions range test was used to assess the socio-economic characteristics and entrepreneurial activities among homestead food gardening and irrigation crop farmers.

5.3 MAJOR FINDINGS

The study revealed that all farmers are blacks (100%), female (51.3%), between the age brackets of 30-60 (50%), farming experience less than 10 years (40%) married (46.9%), secondary school education (48.1%), Christians (100%), 1-3 adults per homestead (85.6%), 4-7 children per homestead (49.4%), 1-3 males residing per homestead (indicate percentage), 1-3 females per homestead (52.5%), 1-3 members of household active in homestead gardening (78.8%), number of household members active in irrigation crop farming (82.5%).

Most prominent socio-economic impact: sources of water for domestic use by tap (79.4%), sources of water for irrigation by borehole (61.9%), source of income by remittances (55%), communal land (50%), mixed cropping (61.9%), source of information through extension officers (98.8%), radio (98.1%), uses of crops grown for household consumption (99.4%), marketing outlets (99.4%), expansion of plot (96.3%), willing to increase the number of crops produced (96.3%), farmers' participation in agricultural or social organisations through local community club meetings (66.9%), extent of participation through local community club conferences (38.3%), method of irrigation practised (33.8%) basin, resources used in homestead activities (99.4%) wheel barrow and spade, homestead activities carried out by smallholder farmers (100%) irrigating, access to credit from government subsidies (47.5%), human capital (75.6%) knowledge of vegetable gardening, physical capital (78.1%) markets and road accessibility, natural capital (90%) water, social capital (60.6%) relationship of trust, positive psychological capital (81.9%) confidence, optimism (88.1%) talented and goal getters, resilience (62.5%) ability to improvise, market constraint (97.6%) processing, financial constraint (99.4%) lack of access to financial institutions, volatile interest rates and low profit viability, production constraints (99.4%) high input cost, climate change, entrepreneurial skills (78.8%) high need for achievement, independent thinkers.

5.4 CONCLUSION

This study has examined entrepreneurial activities among homestead food gardening and irrigation crop farming in the North West province. In terms of personal characteristics of rural-dwellers engaged in home gardening and irrigation crop farming, there is female dominance. The majority of farmers are aged between 30-60 years, most are married and have secondary education, the household size of most farmers is 1-3 adults, 4-7 children, 1-

3 dependants, size of homestead food garden 0.1-1 ha, 1-3 household members involved in homestead food gardening and 1-3 household members active in irrigation crop farming.

Farmers use the crops grown for household consumption and sales in order to generate income. Most predominant entrepreneurial activities among in-home gardening and irrigated crop farms are self authority, high need for achievement and independent thinkers. It has been indicated that the constraints to entrepreneurial activities are marketing, financial and production constraints.

It has also been emphasised in the study that homestead food gardeners faced challenges relating to market accessibility due to lack of sufficient information regarding marketing outlets, farmers access information through extension officers and the radio. Most respondents used communal land and all accessed water for irrigation. Majority of the farmers were affiliated with local community clubs but did not have sufficient information on how to penetrate marketing outlets. It has been revealed that most farmers have knowledge of vegetable farming. It has been highlighted in the study that most respondents access credit from government subsidies.

The research revealed that most households were entitled to various capitals. The human capital was knowledge of vegetable gardening, physical capital consisted of markets and road accessibility, natural capital comprised of water, social capital consisted of the relationship of trust, positive psychological capital was based on confidence, optimism on talent and goal getters, resilience on the ability to improvise, market constraints on processing, financial constraints on lack of access to financial institutions, volatile interest rates and low profit viability, production constraints on high input cost, climate change, entrepreneurial skills on high need for achievement, independent thinkers.

5.5 RECOMMENDATIONS

The study revealed various factors affecting livelihood sources. Consequently, there is a need for these households to be consistently supplied with market information. Households sold their produce locally at a low price because the prices had to be convenient to individuals. It is also important to provide homestead farmers with the most current available market information, and procedures and rules of these markets. Extension officers should be updated with the latest information in order to share ideas with farmers on available market information, how to access funding from various organisations, adaptive and high yield

production technologies and by supporting small-scale production systems. It should be taken into consideration that information is distributed to farmers in time.

Farmers should be trained on how to expand their plots and how to manage their finances. Most respondents use farming to maintain their livelihoods. The government and NGOs should work hand in hand to assist farmers with funding in order to improve their infrastructure and production inputs. By so doing, it will sustain and maintain the standard of living of farmers and increase their produce, generate income and also enable them to create jobs in order to alleviate poverty.

5.6 SUMMARY OF CHAPTER

This chapter has presented the summary, the major findings, the conclusion and recommendations of this study on entrepreneurial activities among homestead food gardening and irrigation crop farmers in the North West province, South Africa.

REFERENCES

- Adesope, O. M., Matthews-Njoku, E. C., Oguzor, N. S., & Ugwuja, V. C., (2012), *effect of Socio-Economic Characteristics of Farmers on Their Adoption of Organic Farming Practices*. Crop Production Technologies. Intec Publishers. From< <http://www.intechopen.Com/books/crop-productiontechnologies/effect-of-socio-economic-characteristicsof-farmers-on-adoption-of-organic-farming-practices>> (Retrieved on July 13, 2013)
- Agri SA, (2005/2006), *organised agriculture*, Agricultural digest. Available on line: <http://www.agriinfo.co.za>
- Ahiablame, L., Engel, B., & Venort, T., (2012), *improving water supply systems for domestic uses in Urban Togo: the case of a suburb in Lomé*. *Water*, 4(1), 123-134.
- Ali, H. M., (2010), *fundamentals of irrigation and on farm water management*. Vol 1.pp 453-487
- Asaduzzaman, M., Naseem, A & Singla, R., (2011), *benefit cost assessment of different homestead vegetable gardening on improving household food and nutrition security in rural Bangladesh*. In 2011 Annual meeting, July 24-26, 2011, Pittsburgh, Pennsylvania (no. 104525). Agricultural and Applied Economics Association
- Backerberg, G.R., Sanewe, A.J., (2010), *towards productive water use and household food security in South Africa*. Vers L'Utilisation productive de l'eau et la securite alimentaire en Afrique du sud. In paper present at 6th Asian regional conference of ICID held in Indonesia (Vol-10, p.16)
- Bagson E & Wuleka Kuuder C L., (2013), *assessment of a small scale irrigation scheme on household food security and leisure in Kokoligu, Ghana*. Vol 3
- Barlow, L, Van Dijk, N., (2013), *market investigation of black emerging farmers in South African horticulture*
- Bernard, C., Cephas, M., & John, B., (2013), *community gardens and food security in rural livelihood development: The case of entrepreneurial and market gardens in Mberengwa, Zimbabwe*. *Russian Journal of Agricultural and Socio-Economic Sciences*, 13(1).

Blaai-Mdolo, B., (2009), *the green revolution and poverty alleviation: challenges faced by women in small-scale agriculture, an investigation into the Siyazondla Homestead Food Production Programme, Mbhase Local Municipality, Eastern Cape* (Doctoral dissertation).

CDC,(2009), *types of agricultural water use*. Available on line:
<http://www.cdc.gov/healthywater/other/agricultural/types.html>

Chazovachii, B., (2012), *the impact of small scale irrigation schemes on rural livelihoods: the case of Pangai irrigation scheme Bikita District Zimbabwe*. Journal of sustainable Development in Africa, 14(4), 217-231

Chell, E., (2008), *the Entrepreneurial Personality: a social construction*. Routledge.

Cousins, B., (2010), *what is a 'smallholder'? Reforming land and resource use in South Africa: Impact on livelihoods*, 8, 86

Cousins, B., (2002), *reforming communal land tenure in South Africa: why land titling is not the answer*. Cape Town Programme for land and agrarian studies.

De Klerk, M., Drimie. S., Aliber. M., Mini,S., Mokoena, R.,Randela,R., Salome Moselle,C. De Swardt, and Kirsten, J., (2004), *Food security in South Africa: Key policy issues for the medium term*. Human science research council integrated rural and regional development position paper

De Lange, M., (1994), *Small scale irrigation in South Africa: water research commission of South Africa*. Pretoria.pp.29

De Lange, M., (1997), *Promotion of low cost and water saving technologies for small scale irrigation*. MBB consulting engineers

ESC,(2005),*Common country assessment*. Available on line:
<http://www.esc.co.sz/cca/cca10.htm>,06/09/2005

Fanadzo, M., (2012), *Revitalization of smallholder irrigation schemes for poverty alleviation and household food security in South Africa: A review*, Vol. 7(13), pp.1958-1969

Fandazo M., Chikuza C & Mniken, P. N., (2010), *Overview of smallholder irrigation schemes in South Africa: Relationship between farmer crop management practices and performance*. African journal of Agricultural Research 5.25

FAO, (1995), *irrigation in Africa in figures. Water Reports. FAO*: Rome, viewed 26 March 2013, from <http://www.fao.org/ag/agl/aglw/aquastat/glossary/index.jsp>

FAO, (1997), *farm management for Asia: A system approach*. Department of Agriculture and resource economics, university of New England, Australia

FAO, (1997), *food and agriculture organisation of the United Nations*. Chapter 8 from agricultural policy to rural policy-central Europe in transition. “providing services to agricultural producers and rural people”. Rome

FAO, (2000), *socio economic impact of smallholder irrigation development in Zimbabwe: Case study of ten irrigation schemes*. Harare. Zimbabwe

FAO, (2005), *information system on water and agriculture*. Water report. No 29

Ferguson, A. E & Mulwafu, W. O., (2005), *irrigation reform in Malawi: Exploring critical land water intersection*. African water laws: Plural legislative frameworks for rural water management in Africa. 26-28

Fernandes, E.C.M., Nair, P.K.R., (1986), *an evaluation of the structure and function of tropical home gardens*, Agr Syst, 21: 279-310

Flachs, A., (2010), *food for thought: The social impact of community gardens in the Greater Cleveland Area*. Electronic Green Journal, 1 (30)

GEM, (2013), *fifteen years of assessing entrepreneurship across the globe*. Global report. Available on line: www.remconsotium.org

Gidi, L.S., (2013), *rural livelihoods strategies and opportunities with regard to farming: a case study of Intsika Yetha Local Municipality*. (Master of Science degree, University of Ford Hare)

Gomo, T., (2010), *assessing the performance of smallholder irrigation in South Africa and opportunities for deriving best management practices*, M.SC. Thesis, University of Kwa Zulu Natal

Hofferth, S. L., 2003. 'Persistence and change in the food security of families with children, 1997-1999'. Department of family studies, University of Maryland, viewed 31 December 2011, from <http://www.findarticles.com/p/mi1309/is340/ai111027115>.

Hussain, I and Hanjra, M.A., (2004), *Irrigation and poverty Alleviation: Review of empirical evidence*. Irrigation and drainage, 53(1), 1-15

Institutional constraints for smallholder agriculture, (2006), *Taung irrigation case study*, available on line: [http:// www.aeasa.org.za](http://www.aeasa.org.za)

International Commission on Irrigation and drainage (ICID), (2007), *Call for second African Regional Conference on the theme: contributing of rain fed and irrigated agriculture to poverty alleviation through increased productivity in Africa*, SANCID (Johannesburg. 6-9 November 2007)

Jari, B., (2009), *Institutional and technical factors influencing agricultural marketing channel choices amongst smallholder and emerging farmers in the Kat river valley*. (Msc in agric economics)

Joemat-Peterson, T., (2012), *National Budget Speech*. Department of Agriculture, Forestry and Fisheries. Pretoria. South Africa

Kabir, M. E & Webb E. L., (2009), *Household and home garden characteristics in South West Bangladesh*. Agro forestry systems. 75(2). 129-145

Kay, M., (2001), *Smallholder irrigation technology*. Prospects for Sub Saharan Africa. No 3. Food agriculture org (FAO, 2001)

Kerlinger, F.N., Lee, H.B., (2000), *Foundations of behavioural research*. Belmont. Wadsworth

Kibirge, D., (2013), *the impact of human dimension on smallholder farming in the Eastern Cape province, South Africa*

Kilpatrick K., (2011), *Supporting irrigation for food security in Malawi. Oxfam case study*. Oxfam International. UK

Kirsten, J & Moldenhauer, W.,(2006), *Measurement and analysis of rural household income in a dualistic economy: The case of South Africa*, Agrekon, vol 45, no 1 (March 2002)

Koch B & Khosla R., (2003), *the role of precision agriculture in cropping systems*. Journal of crop production. 9 (1-2), 361-381

Kyei-Baffour, N., Ofori, E., (2006), *Irrigation Development in Ghana: Prospects and challenges*, Vol. 26(2)

- Lahiff, E., & Cousins, B., (2005), *Smallholder agriculture and land reform in South Africa. IDS Bulletin*, 36(2), 127-131.
- Landon-Lane, C., (2011), *Livelihood Grow in Gardens- Diversifying Rural Income Through Home Garden*, Volume 2. Rome, Italy: Food and Agriculture Organisation of the United Nations
- Machethe, C.L., Mollel, N.M., Ayisi, K., Mashatola, M.B., Anim, F.D.K., and Vanasche, F., (2004), *Smallholder irrigation and agricultural development in the Olifants river basin of Limpopo province: Management transfer, productivity and food security issues*. Pretoria: Water research commission
- Machingura, C., (2007), *An analysis of factor that can be used to identify successful smallholder farmers, a case study of Mbhashe and Ngqushwa* (Doctoral dissertation, university of Ford Hare)
- Marsh, R., (1998), *Building on traditional gardening to improve household food security*. Food Nutr Agr, 22:4-14
- Masigo, A., Mashego C., (2002), *Provincial report on education and training for agriculture and rural development in North West Province*. North West Department of Agriculture, Conservation and Environment
- Mathias, J., Mertin, P. & Murray, A., (1995), *the psychological functioning of children from backgrounds of domestic violence*", Australian Psychologist, 30, 47- 56.
- Mbusi, N., (2013), *Assessment of source of livelihood and opportunities to improve the contribution of farming within available food chains* (Masters of Science degree, university of Ford Hare)
- Middleton, J., (2009), *Community Gardening*. Columbia, University of Missouri
- Molebatsi L Y. Siebert S J. Cilliers S S Lubbe C S & Davoren E., (2010), *The Tswana tshimo: A home garden system of useful plants with a particular layout and functional*. Afr j Agric res, 5 (21), 2952-2963
- MTSF, (2014-2019), *Medium term strategic framework*. Available on line: <http://www.pmg.org.za/>

Muchara, B., (2011), *Analysis of food value chains in smallholder crop and livestock enterprises in Eastern Cape province of South Africa* (Doctoral dissertation, University of Fort Hare).

Nafziger, E., (2012), *Cropping systems*. Illinois agronomy hand book. Available on line at: [http:// extension. Crops.cornell. Edu/handbook](http://extension.crops.cornell.edu/handbook)

Nair, P.K.R., (1993), *an introduction to agro forestry*. Dordrecht, the Netherlands: Kluwer Academic Publishers

Obidike, N.A., (2011), *rural farmers' problems accessing agricultural information: a case study of Nsuka local government area of Egunu state*, Nigeria

Pandeti, M .P., (2005), *a study on entrepreneurial behaviour of farmers in Raichur District of Karnataka*, M.SC. Thesis, University of Dharwad.

Perret, S., (2002), *local empowerment in smallholder irrigation schemes: A methodology for participatory diagnosis and prospective analysis*. Water Governance for Sustainable Development: Approaches and lessons from Developing and Transitional Countries. 239

Perret, S. R., Touchain, E.:Policy Document., (2002), *a simulation- based approach to assess the economic viability of smallholding irrigation schemes in South Africa: Conceptualisation and first implementation*. For: CIRAD

Polak, p., Sivanappan, R. K., (1998), *the potential contribution of low cost Drip irrigation to the improvement of irrigation productivity in India*. In proceedings of the National seminar on micro irrigation and sprinkler systems. Vol28. P.30

Pote, P. P. T., (2008), *technical constraints in smallholder agriculture: A case study of Nkokobe municipality, Eastern Cape, South Africa*, viewed 31 December 2011, from [http://ufh.netd.ac za/jspui/handle/103](http://ufh.netd.ac.za/jspui/handle/103)

Rasinghe, T.T., (2009), *manual of Low/ No-Space Agriculture cu- faily Bussiness Gardens*. A.N Leusden, The Netherlands: RUAF Foundation

Rees, T and Kees, D., (1991), *irrigation technology and social change: An analysis of the social variable of technology: Journal of developing areas*, vol.25, and no.2 January 1991. Ed. Illions University, 900 West Adams Street. U.S.A

Reinders, F.S., (2011), *irrigation methods for efficient application: 40 years of South African research excellent*. Water SA, 37 (5), 765-770

Robbins, P., Bikonde, F., Ferris, S., Kleih, U., Okobi, G. & Wandschneider, T., (2004), *collective marketing for smallholder farmers: manual 4: the territorial approach to rural agro-enterprise development*. CIAT

Romuld, S., & Sandham, J., (1996), *gender issues and farming systems research and extension in Ethiopia*, Proceedings of the international workshop, institute of agriculture research, Addis Ababa, Ethiopia.

Rudmann, C (Ed.), (2008), *entrepreneurial skills and their role in enhancing the relative independence of farmers*. Results and recommendations from the research project Developing Entrepreneurial skills of farmers. Research institute of organic agriculture, Frick, Switzerland.

Singh, R. B, Kumar P & Woodhead T., (2002), *smallholder farmers in India: Food security and agricultural policy*. RAP publications

Speelman, S., D'haese, M., Buysee, J and D'Haese, L., (2007), *technical efficiency of water use and its determinants*. Study at small scale irrigation schemes in North West Province, South Africa

Speelman, S., Frija, A., Perret, S., D'haese, M., Farolfi, S and D'Haese, L., (2011), *variability in smallholders' irrigation water values: Study in North West Province, South Africa*. Irrigation and drainage, 60(1), 11-19

Sthapit, B.R., Rana, R.B., Hue, N.N., Rijal D.R., (2004), *the diversity of taro and sponge gourds in traditional home gardens in Nepal and Vietnam*. In Home Gardens and Agro biodiversity. Edited by Eyzaguirre PB, Linares OF. Washington DC, USA: Smithsonian Boos; 2004:234-254.

Suleiman, S., (2010), *irrigation job creation and food security*, Suleimans blog, 25 December .Available on line at: <http://suleimansblog.blogspot.com/2010/12/irrigation-job-creation-and-food.html>

Ton, K & Jong, K. D., (1991), *irrigation technology and social change: An analysis of social variables of technology*. The journal of developing areas. 25. 197-206

Torquebiau, E., (1992), *are tropical agro forestry gardens sustainable?* Agric Acosyst Environ, 41: 189-207

Tshwene, B., (2011), *provincial annual report*. Department of Agriculture and Rural Development. South African Government information. North West Province. South Africa

Ugwumba, C.O.A & Omojola, J.T., (2012), *credit access and productivity growth among subsistence food crop farmers in Ikole local government area of Ekiti state*, Nigeria. ARPN Journals.

USGS, (2013), *irrigation: How farmers irrigate fields*. Available on line: URL:<http://ga.water.usgs.gov/edu/iriquicklook.html>

Van Averbeke, W., Mohammed, S.S., (2006), *smallholder irrigation in South Africa: Past, present and future*. 2nd symposium of the SANCID. The changing face of irrigation in South Africa, Mpumalanga, South Africa. pp15-17

Van den Bold, M., Pedehombga, A., Duedraogo, M., Quisumbing, A.R. & Oley, D., (2013), *Can integrated agriculture-nutrition programs change gender norms on land and assist ownership*

Van der Merve, J. D, Cloete, P. C and Van Scalkwyk, H. D., (2012), *choosing between agricultural developments projects in the North West Province of South Africa: A multiple criteria analysis*. African journal of agricultural research, 7(27), 3906-3917

Vermillion, D. L., (1997), *impacts of irrigation management transfer: A review of the evidence*. Srilanka: International irrigation management institute

Vogel, C., Smith, J., (2002), *the politics of scarcity: Conceptualising the currents food security in Southern Africa*. S Afr J Sc. 98:315-317

Volg, C.R and Volg-Lukasser, B., (2003), *traditional, dynamics and sustainability of plant species composition and management of home gardens on organic and non organic small scale farms in Alpine Eastern Tyrol, Australia*. Biological agriculture and horticulture, 21(4) 349-366

Web, N. L., (2000), *food gardens and nutrition: Three South African case studies*. Journal of family ecology and consumer science. 28 (1)

ENTREPRENEURIAL ACTIVITIES AMONG HOMESTEAD FOOD GARDENING AND IRRIGATION CROP FARMERS IN THE NORTH WEST PROVINCE, SOUTH AFRICA

Questionnaire identification number	
Study area	
Respondent name	
Interviewer's name	
Date of interview	

Personal characteristics and socio- economic factors

Household head race (Tick)	Black	
	White	
	Colored	

Household head gender (Tick)	Male	
	Female	

Household head age	
Farming experience	

Household head marital status (Tick)	Single	
	Married	
	Divorced	
	Widowed	

Highest school level of the household head (Tick)	Abet	
	Primary	
	Secondary	
	Tertiary	
	None	

Religious belief

Category	Tick
Christian	
Traditional	
Muslim	
Other (specify)	

Household size

Category	Number
Adult	
Children	
Male	
Female	
Total	

Number of dependants

Size of homestead food garden (Ha)

Number of household members active in homestead garden	
Number of household members active in irrigation crop farming	

Source of water for domestic use (Tick)	Tap	
	Protected well	
	Unprotected well	
	River	
	Rain water tanks	
	Tap, river and rain water	

Source of water for irrigation (Tick)	Tap	
	Well	
	River	
	Rain water tanks	
	Rain water harvesting	
	Spring	
	Borehole	
	Dam	

Employment status (Tick)	Employed	
	Unemployed	
	Self employed	
	Student	
	Other (specify)	

What is/ are the source/s of income for the farmer?

Sources	Tick
Wage	
Pension	
Remittances	
Family business	
Non-farm income	
Other (specify)	

Type of land ownership (Tick)

Own land	
Communal land	
Leased land	
Land reform	
Rent	

What type of cropping system does the farmer follow? (Tick)

Mono cropping system	
Double cropping system	
Multiple cropping system	
Mixed cropping	
Crop livestock integration	

Do you have contact with the extension officer? Yes..... No.....

Please indicate the sources of information

	Yes	No
Television		
Radio		
Phone		
Internet		
News paper		
Magazine		
Computer		
Public participation		

Use of crops grown

	Yes	No
Household consumption		
Sales		
Livestock consumption		
Gifts		
Buttering		

Marketing outlets

	Yes	No
Community		
Schools		
Tuck shops		
Clinics		
Pick and pay		
Choppies		
Shoprite		
Hospice		
Pension pay point		
Farmers market		

Expansion of plot

	Yes	No
Are you willing to expand		
Do you have potential for expansion		
Are you willing to increase the size of the plot		
Are you willing to increase the number of plot in different location		
Are you willing to increase the number of crops produced		

Resources used in homestead activities (Tick)	List	Tick
	Trailer	
	Scotch cart	
	Tractor	
	Vehicle	
	Hand hoes	
	Shovels	
	Plough	
	Harrow	
	Wheel barrow	
	Sledge	
	Garden fork	
	Knap sack sprayer	
	Sickle	
	Spade	
	Rake	

Homestead activities carried out by smallholder farmers

	Yes	No
Land clearing		
Ploughing		
Harrowing		
Nursery		
Transplanting		
Stalking		
Planting		
Ridging		
Weeding		
Irrigating		
Fertilizer application		
Manure application		
Water control and management		
Irrigation/ water maintenance		
Spraying (pesticides)		
Harvesting		
Washing		
Trimming		

Impact of homestead food gardening and irrigation crop farming on the livelihood of smallholder farmers

Financial capital	Availability		Adequacy	
	Yes	No	High	Low
Access to credit from:				
Banks				
Cooperatives				
Money lender				
Saving				
Regular remittance				
Pensions				
Relatives				
Personal savings				
Contractors				
Government subsidies				
Human capital				
Training				
Vocational training				
Extension service				
Skills training				
Knowledge of gardening				
Knowledge of vegetable production				
Record keeping				
Water management				
Equipment handling				
Financial management				
Soil management				
Crop protection				
Physical capital				
Transport				
Water supply canal				
Markets				
Road accessibility				
Electricity				
Storage				
Natural capital				
Land				
Water				
Environment				
Biodiversity				
Trust relationship				
Water use right				
Land tenure				
Social capital				

Networks				
Group memberships				
Relationship of trust				
Access to wider institution of society				
Positive psychological capital				
Confidence				
Self efficiency				
Individuals ability to motivate				
Individuals ability to mobilize				
Strong positive relationship to work related performance				
Optimism				
Easily fed up				
Giving up				
Discouraged easily				
Talented				
Goal getter				
Demotivated				
Resilience				
Flexibility in adjustment				
Deep belief				
Ability to improvise				
Ability to adapt to significant change				
Ability to resist stress				

Constraints faced by smallholder homestead food gardeners and irrigation crop farmers

Marketing constraints		Tick
	Marketing information	
	Market price	
	Transportation	
	Processing	
	Preservation	
	Packaging	
	Lack of marketing skills	
Financial constraint	Lack of access to financial institutions	
	Lack of financial surety	
	Volatile interest rates	
	Lack of income	
	Low profit viability	
	Lack of financial skills	
Production constraints	High input cost	
	High implements costs	
	Lack of production knowledge	
	Climate change	
	Shortage of water	
	Pests	
	Water availability	
	Lack of production skills	

Entrepreneurial activities

Please indicate if you carry any of these activities

Entrepreneurial activities	Willingness to engage in activities			
	Yes	No	Yes	No
Product design				
Distribution/sales/service				
Manufacture new products				
Promotion				
Obtaining resources				
Research and development				
Protecting intellectual property				
Obtaining raw materials				
Identifying a market opportunity				
Drive and energy				
Self-confidence				
High initiative and personal responsibility				
Internal locus of control				
Tolerance of ambiguity				
Low fear of failure				
Moderate risk taking				
Long-term involvement				
Money as a measure not merely an end				
Use of feedback				
Continuous pragmatic problem-solving				
Self-imposed standards				
Clear goal setting				
High need for achievement				
Self-authority				
Independent thinkers				
Intuitive and resourceful working style				
Business failure is personal failure				
Belief in the ability to control outcomes				
Risk takers				
Self-motivated				
Dissatisfaction with present status of achievement				
Work experience				
Life path interruption				
Invention/ creativity				
Technology changes				
Change in property				
New capital				
Unique employees				
Perceive and recognize a fit				
Secure resources				
Secure markets				

Employ and develop capabilities				
Perceiving opportunity of un-met market need				
Perceiving opportunity of under-deployed resources				

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30 December 2014

CERTIFICATE OF LANGUAGE EDITING

The dissertation entitled

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Submitted by

REMONGWE MOTHUPI (16151585)

For the degree

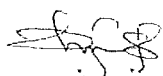
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