

**ECONOMIC CONTRIBUTION OF BACKYARD GARDENS IN ALLEVIATING
POVERTY IN THE RURAL COMMUNITIES OF BOJANALA PLATINUM DISTRICT
MUNICIPALITY, IN NORTH WEST PROVINCE, SOUTH AFRICA.**

BY

NEO WILLIAM MOKONE

(37346423)

Submitted in accordance with the requirements

for the degree

MASTER OF SCIENCE

In the subject

AGRICULTURE

at the

University of South Africa

SUPERVISOR: PROFESSOR M. A. ANTWI

July 2016

DEDICATION

This thesis is heartily dedicated to both my grandparents and brother who took the lead to heaven before the completion of my studies.

To my beautiful, amazing, God fearing wife, sister Lerato Angel Mogotsi Mokone for her endless support, love, care and for warming the bed when I was up at night, she never, not even once complained that I was up the whole night, instead she ensured coffee was available throughout the completion of this thesis.

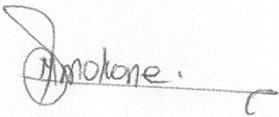
Finally my very special dedication to my parents whom I owe everything I am today. My deepest gratitude to my entire family, relatives and friends for their unflagging love and unconditional support throughout my life and my studies. Their unwavering faith and confidence in my abilities and in me is what has shaped me to be the person I am today. Thank you for everything.

DECLARATION

I, Neo William Mokone declare that "ECONOMIC CONTRIBUTION OF BACKYARD GARDENS IN ALLEVIATING POVERTY IN RURAL COMMUNITIES OF BOJANALA DISTRICT MUNICIPALITY, NORTH WEST PROVINCE, SOUTH AFRICA" is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete reference.

SIGNED

DATE: July 2016

A handwritten signature in black ink, appearing to read 'Neo William Mokone', with a horizontal line extending to the right.

.....
Name: Neo William Mokone
Student number: 37346423

ACKNOWLEDGEMENTS

Though only my name appears on the cover of this dissertation, a great many people have contributed to its production; this thesis owes its existence to the help and support of those people. I could have never reached the heights or explored the depths without their efforts. I owe my gratitude to all those people who have made this dissertation possible and because of whom my graduate experience has been one that I will cherish forever.

I first need to give thanks to God, through Jesus Christ and the Holy Spirit (Ephesians 5:20) for the strength, ability, courage, wisdom and endurance to complete my Masters.

My deepest gratitude is to my supervisor, Prof M.A Antwi. I have been amazingly fortunate to have a supervisor who gave me the freedom to explore on my own, and at the same time the guidance to recover when my steps faltered. Prof Antwi taught me how to question thoughts and express ideas. His patience and support helped me overcome many crisis situations and finish this dissertation. I hope that one day I would become a good supervisor to my students as Prof Antwi has been to me.

I would like to thank my mentor Dr J. Mashipata for instilling in me the qualities of being a good academia. His infectious enthusiasm and unlimited zeal have been major driving force through my graduate career at Tshwane University of Technology.

I would like to take this special opportunity to thank both Dr Matshego and Dr Matuwane (Dept. of Agriculture, North West province, Bojanala Region) with whom I forged a special relationship within a short period of time, for their support and helpful advice.

Many thanks goes out to the Municipal Manager of Bojanala Platinum District Municipality for granting me the permission to conduct the research within the District Municipality.

I gratefully acknowledge the funding received towards my Master's Degree from the Unisa Masters research and Doctoral Bursary.

I am also deeply thankful to my informants. Their names cannot be disclosed, but I want to acknowledge and appreciate their help and transparency during my research. Their information has helped me complete this dissertation.

My greatest gratitude goes to my friend, a brother Mr. Simone Maake who patiently revised and corrected my dissertation.

I would never forget all the chats and beautiful moments I shared with some of my associates at the University. They were fundamental in supporting me during these stressful and difficult moments. I would like to mention one good sister (Ms FP Tshilowa) who personally contributed to this thesis.

May the Almighty God bless you all, SHALOM!!!

ABSTRACT

Backyard gardens has been identified as one of the possible solutions to some of the issues surrounding poverty alleviation in the Bojanala Platinum District Municipality. The main objective of the study was to determine the economic contribution of backyard gardens in alleviation of poverty in rural communities of Bojanala Platinum District Municipality in the North West Province, South Africa. The study used purposive sampling for data collection from the study respondents which enabled the researcher to select a sample with experience and knowledge about the study variables. The questionnaire used as data collection instrument was pretested, validated and subjected to reliability test to improve the efficiency of the use of the questionnaire. The collected data was sorted, coded and analysed using Statistical Package for Social Science (SPSS) Version 23.0 software. Frequency count and percentage were used to summarize the data into tables and graphs. The linear multiple regression model specification was employed to examine the demographic and socio-economic factors (predictors) that influence the generation of income from backyard gardens. Multinomial logistics regression model was also used to determine factors influencing the respondents' objectives for the Backyard gardens, while the logit regression model was used to analyse determinants of the proportion of backyard land used for backyard farming by respondents/growers.

The findings of the study are that: more females (68.2%) were involved in the study than males (31.8%); youth involved in the study were 27.7%; the majority (60.4%) of respondents are in the age group of 41-70 years of age; majority (69.5%) of respondents had matric education, 20.9% had tertiary education, and 3.6% had below matric education whilst 5.9% had no formal education; most of respondents are unemployed (86.6%); 32.2% of respondents are dependent on pension as their source of income, 12.3% depend on grant, 15% depend on monthly salaries, 0.5% depend on investments, 2.3% depend on remittance, and 18.6% depend on piece jobs, whilst 19.1% reported other source of income; majority (99%) of respondents reported that backyard garden contribute a significant proportion to both household income and food security, whilst 1.0% did not agree; 40% of the respondents could not manage to farm the whole garden area, while 60% were able to farm the entire garden area; the majority (70.9%) of respondents provide own solutions to their backyard garden challenges; majority (53.7%) of respondents reported that extension officers never

visited their gardens, whilst 46.3% had extension visits on weekly, monthly and quarterly bases; 23.2% of the respondents created permanent employment while 34.1% of them created seasonal employment.

The results of the OLS regression analysis showed that gender of respondents, with formal employment, ownership of a farm besides the Backyard garden (BYG) by respondent, farmers' years of experience in farming and annual income from the sale of livestock by respondent had positive and statistically significant influence on the annual income from Backyard garden with all other factors held constant.

The results of the multinomial regression analyses show that a unit change in number of years involved in backyard gardening (YRSBG) does not significantly change the odds of being classified in the 4th category of the outcome variable (Produce to help the needy, the poor, to feed the orphans, and for home based-cares around their communities = 4) relative to the first or second or third categories of the outcome variable, while controlling for the influence of the others. On the other hand a unit change in being employed (EMPLO) and involved in non-farm activities (NFA) do significantly change the odds of being classified in the 4th category of the outcome variable relative to the second or third categories of the outcome variable, while controlling the influence of the others.

The Logit coefficient estimate associated with Age, Income per month from BYG, Engage in non-farm activities, Years of experience in gardening, Proportion of produce consumed, having a business plan, Own a farm besides BYG and to lease your backyard have statistically significant impact on respondents area of cultivation for BYG with other factors held constant. Policies to improve BYG in the district should be informed by the aforementioned variables from the results of the inferential analyses.

Keywords: Backyard garden. Food security. Socio-Economic. Demographic. Income contribution. Respondents.

TABLE OF CONTENTS.

Contents	Page
Dedication	ii
Declaration	iii
Acknowledgement	iv
Abstract	v
Keywords	vi

CHAPTER ONE: INTRODUCTION

1.0 Introduction	1
1.1 Background and Introduction	1
1.2 Problem statement	2
1.3 Objective of the study	2
1.4 Specific objectives of the study	3
1.5 Research questions	3
1.6 Hypotheses	4
1.7 Significance of the study	4
1.8 Ethical considerations	4
1.9 Outline of the study	5
1.10 Summary of chapter	5

CHAPTER TWO: LITERATURE RIVIEW

2.0 Literature review	7
2.1 Introduction	7
2.2 Definition of Backyard gardens	7
2.3 Worldwide overview of Backyard gardens	7
2.4 Backyard gardens in Bojanala Platinum District Municipality	11
2.5 Summary of chapter	12

CHAPTER THREE: RESEARCH METHODOLOGY

3.0 Research Methodology	13
3.1 Introduction	13
3.2 Study area	13
3.3 Study design	15
3.4 Data	15
3.4 Study population, sampling and sampling size	15
3.5 Data collection	15
3.6 Data analysis	16
3.7.1 Inferential analysis	16
3.7.1.1 Assessment of factors that influence the generation of income from backyard gardens.	16
3.7.1.2 Factors influencing objectives of respondents regarding backyard Farming.	19
3.7.1.3 Determinants of proportion of backyard land used for backyard farming by respondents/growers.	22
3.8 Ethical issues	24
3.9 Dissemination of information	24
3.10 Summary of chapter	24

CHAPTER FOUR: RESULTS AND DISCUSSION

4.0 Results and discussion	25
4.1 Introduction	25
4.2 Demographic characteristics of respondents	25
4.3 Socio economic characteristics of respondents of the study	28
4.3.1 Employment status and sources of income respondents	28
4.3.2 Contribution of backyard gardening to household income and food security	31
4.3.3 Characteristics of backyard gardening among respondents	32
4.4 Production aspects of the respondents regarding backyard gardens	35
4.5 Livestock production aspects amongst respondents	37
4.6 Backyard garden inputs purchased by respondents	41

4.7 Market reliability	41
4.8 Skills pertaining to gardening activities	42
4.9 Business plan and farming process	44
4.10 Attending and providing solution to challenges encountered by respondents	45
4.11 Job creation / Labour information	46
4.12 Information on economic viability	47
4.13 Challenges encountered by respondents in the study area	48
4.14 Results and discussion of the inferential analysis	51
4.14.1 Factors influencing the annual income of backyard gardens of respondents in the study area	51
4.14.2 Results and discussion of the inferential using the multinomial Logistic model	53
4.14.3 Results and discussion of the inferential analysis using the logit model	57
4.15 Summary of chapter	60

**CHAPTER FIVE: SUMMARY,
FINDINGS, CONCLUSIONS & RECOMMENDATIONS**

5.0 Summary, findings, conclusions and recommendations	62
5.1 Introduction	62
5.2 Summary	62
5.3 Conclusion	65
5.4 Recommendations	66
6.0 REFERENCES	69
7.0 APPENDIX 1	75

LIST OF TABLES

Table 3.1	Variable labels and their expected effects
Table 3.2	Definition and explanation of variables to be used in the empirical multinomial logit model (MLM)
Table 3.3	Variable labels and their expected effects
Table 4.1	Demographic characteristics of the respondents.
Table 4.2	Employment status and income aspects of respondents
Table 4.3	Contribution of backyard garden to household income and food security
Table 4.4	Characteristics of backyard gardening among respondents
Table 4.5	Production aspects of respondents regarding backyard garden
Table 4.6	Livestock production aspects among respondents
Table 4.7	Skills pertaining to gardening activities
Table 4.8	Business plan and farming process
Table 4.9	Sources of personnel attending to and providing to problems encountered from backyard gardens
Table 4.10	Job creation / Labour information
Table 4.11	Information on economic viability
Table 4.12	Challenges encountered by respondents in the study area.
Table 4.13	Mean values, standard deviation and variance of variables used in the regression model
Table 4.14	Results of the OLS linear multiple regression analysis
Table 4.15	Case processing summary
Table 4.16	Model Fitting Information
Table 4.17	Goodness-of-Fit
Table 4.18	Pseudo R-Square
Table 4.19	Likelihood Ratio Tests
Table 4.20	Parameter Estimates
Table 4.21	Parameter estimates of logit regression of factors influencing the proportion of backyard land used for backyard farming by respondents
Table 4.22	Chi-Square Tests

LIST OF FIGURES

- Figure 3.1 Map of Bojanala Platinum District Municipality
- Figure 4.1 Backyard garden inputs purchased
- Figure 4.2 Market reliability

LIST OF ACCRONYMS

BPDM	Bojanala Platinum District Municipality
IDP	Integrated Development Plan
BYG	Backyard Garden
OLS	Ordinary Least Square
STATSSA	Statistics South Africa
NWP	North West Province
DARD	Department of Agriculture and Rural Development
SA	South Africa
UNISA	University of South Africa
UN	United Nations
UNHDI	United Nations Human Development Index
MSA	Municipal Structure Act
LP	Limpopo Province
GP	Gauteng Province
SPSS	Statistical Package for Social Scientist
OLSMR	Ordinary Least Square Multiple Regression Model
OLS	Ordinary Least Square
FAO	Food and Agriculture Organisation
VIF	Variance Inflation Factor
CBD	Central Business District
AIC	Akaike Information Criterion
NFA	Non-Farm Activities
EMPLO	Employment
YRSBG	Years in Backyard Garden

CHAPTER ONE

1.0

INTRODUCTION

1.1 Background and Introduction

Over the years, the population of Bojanala Platinum District Municipality in the North West Province has become increasingly food insecure due to many factors, including rising food prices, import dependency from other Provinces, changing availability of fresh produce and the establishment of informal gardens that yield lower volumes of food (FAO, 2002). These factors have led to a net food import bill, a rise in the cost of food (making it less affordable and forcing rural communities to turn to less healthy sources and cheaper alternatives). The use of backyard gardens has been suggested on numerous occasions as a possible solution to some of the issues surrounding poverty alleviation in the Province. Backyard gardens provide the following benefits to rural communities: they are used to alleviate poverty; feed livestock; provide raw materials for handicrafts, fuel wood and the creation of additional wealth through the sale of surplus produce and homemade goods; a good source of rural employment; and to provide plants for medicinal purposes (Finerman & Sackett, 2003).

There is limited literature on Backyard gardens in Bojanala Platinum District Municipality in North West Province, particularly on their economic contribution. In order to provide a context for this study (in terms of the growth of Backyard gardens), it is important to consider the historical precedents and research conducted on Backyard gardens across the district. It is also important to provide a brief review of the literature on the economic contribution of Backyard gardens as a source of poverty alleviation in rural communities of Bojanala Platinum District Municipality, in the North West Province, South Africa, access to healthy foods, sustainability of food production, economic growth, employment, challenges and benefits of Backyard gardens.

This study examines the economic contribution of backyard gardens in alleviating poverty in the rural communities of Bojanala Platinum District Municipality in the North West Province, South Africa. The economic mainstream of rural communities is examined through Backyard gardening as a strategy for poverty alleviation.

1.2 Problem Statement

Backyard gardens often embrace the broader ambitions of economic development, sustainable livelihoods, rural renewal and self-help frequently associated with such type of gardens. However, the space occupied by Backyard gardens and the social relationship of their surroundings are fundamentally different from those on open space. The land used for backyard gardens limits the gardener in terms of economic production, producing different varieties of vegetables and fruits and to obtain better yields. Backyard gardens are largely hidden behind fences and spaces between houses, near sidewalks and in front of some yards.

As alluded to in the background of the study, the use of Backyard gardens has been identified as one of the possible solutions to some of the issues surrounding poverty alleviation in the Bojanala Platinum District Municipality. However, there is limited literature on Backyard gardens in Bojanala Platinum District Municipality in the North West Province, particularly in terms of the economic contribution of Backyard gardens. This study provides the basis for informed decisions to support the adoption of Backyard garden as one of the strategies for poverty alleviation across the district.

The effect of hunger or poverty cannot be over-emphasized as it affects communities from generation to generation. Having identified these challenges, the study found it necessary to investigate whether Backyard gardens can scale up to have broader economic impacts on communities and whether their ramifications can be used as a strategy for poverty alleviation.

1.3 Objective of the study

The main objective of the study was to determine the economic contribution of Backyard gardens in alleviate poverty in the rural communities of Bojanala Platinum District Municipality in North West Province, South Africa.

1.4 Specific objectives of the study

The specific objectives of the study were to:

- (a) Analyse the demographic and socio economic characteristics of households of backyard farmers in the study area;
- (b) Determine the contribution of Backyard gardens to household food security, job creation, income and to assess factors that impede households from creating income through Backyard gardens;
- (c) Assess factors preventing households from meeting the objectives of Backyard gardening;
- (d) Analyse the proportion of backyard land used for backyard farming, including its determinants; and
- (e) Identify and analyse challenges militating against the development of Backyard gardens within rural communities in the study area.

1.5 Research questions

From the above objectives of the study, the following research questions were formulated:

- (a) What are the contributions of Backyard gardens to household food security, job creation and income?
- (b) What are the factors that impede the creation of income from Backyard gardens?
- (c) What are the factors that prevent households from meeting the objectives of Backyard gardens of either producing solely for home consumption, the market or both or producing to assist the needy, the poor, feed orphans, and for home based-care around rural communities?

- (d) What are the factors that influence the total area of backyard land used for backyard farming by households? and
- (e) What are the challenges inhibiting the maximum development of Backyard gardens within communities?

1.6 Hypotheses

From the above objectives and research questions, it is hypothesised that:

- a) Socio economic characteristics of households do not affect income generation from backyard gardens.
- b) Farmers' years of involvement in Backyard garden, non-farm activities and employment, besides Backyard garden, do not positively and significantly influence the objectives for backyard gardening by households.
- c) Total area of backyard land used for backyard farming is significantly not determined by demographic and socio economic factors.

1.7 Significance of the study

The rationale for conducting this study on backyard gardening is to determine the economic contribution of Backyard gardens in the rural communities of Bojanala Platinum District Municipality in the North-West Province, South Africa as a tool for poverty alleviation. This study is a response to the economic needs of the unemployed and low-income residents in terms of food production as a means of poverty alleviation. The results of this study will be useful for policy makers and implementers of food security programmes in the district. The results may serve as a guide for informed food security policy decisions involving the role(s) of food gardens in the district. Other stakeholders may use the results of the study as a source of literature and methodology.

1.8 Ethical considerations

Research ethics is referred to as a system of moral values that is concerned with the degree to which research procedures adhere to professional, legal and sociological obligations to the study respondents (Polit & Beck, 2004). Ethical considerations and guidelines as proposed by the author were addressed at all stages of the study. In compliance with the regulations of the University of South Africa (Unisa), standardization and uniformity was adopted for the study procedure for all respondents. Permission to conduct the study within the District was obtained from the Municipal Manager of Bojanala Platinum District Municipality. Respondents were consulted and informed about the objective of the research project. Respondents' information was not disclosed to the public and the results were used solely for the purpose of the study. Respondents were treated with respect, dignity, the objectives of the study were outlined and interviews focused solely on issues related to the study.

1.9 Outline of the study

This study is divided into five chapters (1 – 5): Chapter 1 provides the background and introduction of the study. Chapter 2 is the literature review while Chapter 3 focuses on the methodology used in conducting the study. It describes the study area, the population of the study, the sample size and sampling procedures, method of data collection and analysis. The Chapter also states how the objectives of the study were achieved. Chapter 4 presents the results and discussion of the findings of the study. It discusses the economic contribution of backyard gardens in alleviating poverty in rural communities of Bojanala Platinum District Municipality in the North West province, South Africa. Chapter 5 provides a conclusion for the study. It summarises the study, describes the major findings of the study and provides recommendations for future intervention programmes.

1.10 Summary of chapter

This chapter presented the introduction and background of the economic contribution of backyard gardens in alleviating poverty in the rural communities of Bojanala Platinum

District Municipality in North West Province, South Africa. The problem statement, the research questions, objectives of the study and hypotheses of the study were also were identified and stated.

CHAPTER TWO

2.0

LITERATURE REVIEW

2.1 Introduction

The purpose of the chapter is to provide local and international literature on research that has been conducted and published in accredited journals and books about backyard gardening and its contribution to poverty alleviation. Chapter two presents aspects of definition of backyard gardens, the general view of backyard gardens across the globe, the situation of backyard gardens in Bojanala District, and summary of the chapter.

2.2 Definition of Backyard gardens

According to Kumar and Nair (2004), a backyard garden is an intensively worked, land-use system involving deliberate management of multipurpose plants in association with agricultural crops, and invariably livestock, within the compounds of individual households. Molebatsi *et al.* (2010) define a backyard garden as a “land-use form on private or communal land surrounding an individual house with a definite fence as a border around the yard, in which several useful tree species are cultivated (intercropped) with crops and other useful plants, often with the inclusion of small livestock”. This definition is adopted in this study because of its broad and inclusive nature and the fact that it fits with the intention of backyard gardens as an economic strategy of alleviating poverty in the North West Province. This open definition allows for variation in terms of the size and scale of the garden, its location, physical design, function and nature of the garden.

2.3 Worldwide overview of Backyard gardens

The idea of backyard gardens is not a new one and has been outlined in both the gardening and leisure literature as a means of providing for the unemployed and low income in rural communities (Glover, 2004; Hemingway, 1999). People have practised gardening, especially in periods of crisis since the late nineteenth century (Schmelzkopf, 1995). The fact that backyard gardening tends to come about during crisis reflects the food security needs of communities to produce inexpensive, healthy food for themselves (Ferris

et al., 2001). An example that illuminates this relationship between communities, crisis and gardening is the “victory gardens” that rose up during World War II as both an expression of patriotism and a supplement to rural food supplies (Hurt, 1998). These backyard gardens often quickly begin to develop into vehicles for economic emancipation while providing social and recreational benefits for gardeners (Alaimo, Reischl, & Allen, 2010; Glover, 2004). These studies acknowledge backyard gardens as being a key factor in economic liberation. Glover (2004) concludes that the “backyard was a consequence of and source of economic freedom and the end product of a persistent network of individuals who established gardens in their backyards committed to its development”. This quote describes the economic contribution of backyard gardens explored in the study. Thus, backyard gardening can be a factor in alleviating poverty, as well as one of the positive responses in the struggle to restore hope to the less privileged, low-income and the unemployed (Ferris *et al.*, 2001).

There is inadequate literature on the priorities and economic contribution of backyard gardens (Webb, 1998). An exception is a study on the attitudes of active and aspiring gardeners to evaluate the success of backyard gardening. Karaan and Mohamed (1998) maintain that economic contribution is an important indicator of the aspirations of backyard gardening in terms of poverty alleviation and a ‘continuum’ from subsistence to market food production. At the one end of the continuum, subsistence backyard gardening production achieves only what Webb (1998) refers to as ‘negative expenditure,’ whereby savings on expenditure on backyard gardening is used for other household goods. On the other hand of the economic continuum, backyard gardening becomes a business enterprise. Thus, food gardening undertaken by the rural poor, mainly for household food security, could be the beginning of a larger initiative.

In developing countries, Glover *et al.* (2005) argue that even a small, carefully cultivated rural backyard garden plot can supply vegetables to meet the needs of a family, and in some cases, provide staple crops as well. The backyard is described as providing medicinal and culinary herbs, and even wood for fuel, answering a range of economic needs. Meeting these needs outside the market has the benefit of freeing scarce income for other purpose (Finerman & Sackett, 2003). In the history of developed countries,

backyard gardens have played a similar role, supporting the food and other requirements of poor rural-dwellers. Backyard gardening is beneficial to both developing and developed countries (Glover, 2003).

Karaan and Mohamed (1998) reported that the primary or secondary motivation for backyard gardening was home-consumption and income generation. A further motivation was to keep the unemployed occupied; predominantly unemployed women with no training in gardening who volunteered to participate in the project. Some participants in the project took up gardening as a result of previous exposure to a gardening tradition in rural areas. Mention is variously made in the literature of the “importance of backyard gardens as a tool for improving the quality of life” (Nell *et al.*, 2000). However, in the course of the literature review, it was discovered that there are few references to life quality beyond the material aspects of livelihoods and backyard gardening in Bojanala Platinum District Municipality.

There are limited studies on the importance of garden food and its role in the lives of gardeners. There is a considerable body of literature on the economic contribution of backyard gardens as well as a few studies on the cultural significance of gardening practices. However, the food produced is not the focus of this study (Wilson, 1992; Pollan 1991; Hunt & Bulmahn 1993; Westmacott 1992). Studies on backyard gardens suggest that many gardeners, even those with precarious levels of food security, seem to value the produce they grow as much or more for its economic value than for its contribution to family subsistence (Winklerprins, 2002; Ban & Coomes 2004; Thomasson, 1994). Backyard gardens can certainly act as an important alternative and supplement to diets and fill gaps in food supply in times of scarcity and disruption, directly and through sharing of produce (Barker *et al.*, 2013).

However, backyard gardens also meet other important needs. For instance, gardens and the foods produced from such gardens can assist the unemployed in terms of maintaining identities and embodying knowledge as well as adapting them to life in a new place (Kimber, 2004; Head *et al.*, 2004; Klindienst, 2006). In rural communities, backyard gardens can also be an important means of self-expression and a source of pride and satisfaction from self-sufficiency (Winklerprins, 2002; Gaynor, 2006). In addition, sharing

of food from backyard gardens can cement relationships within communities (Winklerprins, 2002; Ban & Coosmes, 2004; Thomasson 1994). A study on backyard gardens revealed that many gardeners sell their vegetables at local markets as well as reserving some of the vegetables produced for home consumption and sharing with neighbours.

Being able to engage in healthy physical recreation by growing one's own vegetables does not only result in "durable benefits" (Farmer, 2012) of social interaction and physical activity, but also counteracts the physical, economic and social negatives created by the current corporate approach to food production and provision (Farmer, 2012). Thus, by engaging in backyard gardening, rural communities are doing more than providing themselves with fresh organic, affordable produce. They are also supporting sustainable agriculture in the process. This includes both the development of economically sound agricultural practices and resistance against negative social and economic results of current industrialised food production systems, which are chemical and energy consuming (Hinrichs, 2000; Johnston, 2003; McLaughlin & Merrett, 2002). As Berry (1981) states: "We like the thought that the outdoor work that improves our health should produce food of excellent quality that, in turn, also improves and safeguards our health, of which gardening or the best kind of gardening is a complete action". Backyard gardens is beneficial for low-income populations in terms of economic contribution as it creates an atmosphere that allows for an environmentally, socially and individually healthy activity and food source (Farmer, 2012).

In conclusion, despite all the benefits reported in the literature, very little empirical evidence of the economic contribution of backyard gardens is available. Studies have not used consistent approaches and their designs do not always evaluate the economic contribution of indicators of backyard gardens directly. Backyard gardening could assist in alleviating poverty in rural communities by stimulating a movement back to agriculture and the domestic production of vegetables which could render people more food secure and less dependent on food imports (Gottlieb & Joshi, 2010; McClintock, 2010). In developing countries, backyard gardens are mainly kept as a way of supplementing the cereal-based diet of rural households and few gardeners have the objective to increase

household income (Ruel, 2001), but merely to save on food expenditure (Martin *et al.*, 2000).

2.4 Backyard gardens in Bojanala Platinum District Municipality

In the backyard gardens of rural communities of Bojanala Platinum District Municipality in the North West Province, South Africa, gardeners usually grow fruits, vegetables, medicinal herbs and ornamental plants (Lamont *et al.*, 1991; Kumar & Nair, 2004). The use of backyard gardens in Bojanala Platinum District Municipality varies, some are used for subsistence agriculture while others are used for commercial production of food crops (Vogl *et al.*, 2004). These gardening systems play an essential role in food and health security (Allen, 2003). Backyard gardening in rural areas and on the peripheries of deep remote rural communities is a relatively old phenomenon in the South African context (Rogerson, 1993). In other parts of Africa, backyard gardening emerged during the time when governments struggled to carry out structural adjustment programmes (Mlozi, 1996). After such introduction of backyard gardening has mainly been considered a strategy for poverty alleviation and to augment the household incomes of the rural poor although increasingly, middle income households are taking up gardening as part time cultivators or entrepreneurs (Hovorka, 2004).

In Southern Africa, research on backyard gardens has concentrated on technical aspects of gardening such as improving methods of cultivation to increase yields (Scott & Brutsch, 1994), and quality of life in terms of household nutrition and livelihoods (Taylor & Jinabhai, 2001). These backyard gardens are established by individuals who pledge support so that the backyard space becomes communal tenure. The benefits of backyard gardens are reported but not limited to access to fresh nutritious foods, promoting physical fitness, knowledge and expertise gained in growing plants (Farmer, 2012).

Backyard gardens are, arguably, the most enduring of all rural enterprises as families have supplemented or provisioned food intake with production from their backyard gardens around the world for centuries (Marsh, 1998). Research on backyard gardens, particularly in the Bojanala Platinum District Municipality, is sparse, mostly due to the informal nature of home gardens as well as their enclosed and private nature (Winklerprins & de Souza

2005; Christie, 2008). Most agricultural economists argue that backyard gardens have similar benefits in terms of health and financial savings as other types of gardens and that they also contribute economically in daily life. One way these interesting arguments can be understood is through the concept of community gardening which brings together issues of starvation, hunger, health, and sustainability as well as the social significance of food in daily life. While poverty is a complex and multifaceted issue, income and human capability are the most common measurements (Gray *et al.*, 2014).

Poverty in South Africa has historically been associated with race, gender and rurality. In 1999, the majority of black South Africans were poor (Rahji, 2000), while female-headed households were more likely to be poorer (Aliber, 2003). The low employment rate in rural communities of Bojanala Platinum District Municipality has forced people to establish backyard gardens in their yards as a means of survival. This has resulted in the transfer of poverty from low income earning to unemployment (May & Rogerson, 1995; Rakodi, 1995).

2.5 Summary of chapter

The presented the background of Bojanala Platinum District Municipality in the North West Province in South Africa, the definition of Backyard garden, Backyard gardens in Bojanala Platinum District Municipality, and a detailed local and international literature review on Backyard gardens.

CHAPTER THREE

3.0

RESEARCH METHODOLOGY

3.1 Introduction

This chapter describes the study design and the area where the research was conducted (Bojanala Platinum District Municipality, North West Province, South Africa). It also describes the population of the study area and the sampling procedure, method of data collection and instruments used to collect data as well as method of data analysis. The types of measurement to which the variables were subjected to and the analytical tools applied are also discussed in this chapter.

3.2 Study area

This study was conducted in the Bojanala Platinum District Municipality (BPDM), North West Province, South Africa. BPDM is one of the four district municipalities in the North West Province. It is situated to the east of the Province. BPDM is a category C municipality in terms of the Municipal Structure Act, Act No 58 of 1999 and also in terms of section 152 of the Constitution of the Republic of South Africa, Act No 108 of 1996 (BPDMG&DS, 2005).

BPDM is surrounded by the Waterberg District Municipality (Limpopo Province) to the north, Tshwane Metropolitan Municipality (Gauteng Province), West Rand District Municipality (Gauteng Province) to the Southeast, Dr Kenneth Kaunda District Municipality to the south, and Ngaka Modiri Molema District Municipality to the west. The seat of Bojanala Platinum District Municipality is the City of Rustenburg, within Rustenburg Local Municipality (Department of Rural Development & Land Reform, 2013). It has five local municipalities as shown in Map below. Information for the study was obtained from the North West Provincial Department of Agriculture, the District Department of Agriculture, Local Municipalities, and other relevant Institutions that have conducted studies on backyard gardening within the district.

The Bojanala Platinum District Municipality in the North West Province (NWP) of South Africa consists of approximately 507 506 people and 501 696 households. Rustenburg Local Municipality has the largest population estimated at about 549 575 people with 199 044 households. The 2011 Census data indicates that the urban population of Bojanala District Municipality accounts for 533 174 people or 35.4% of the total population (SSA, 2012). The Tribal/traditional population accounts for 846 642 people (56.2%) and about 127 690 people (8.5%) living on farms (SSA, 2005).

Almost all the rainfall occurs within the summer months (between October and April). Rainfall decreases from east to west with an average of 539 mm per annum (Cilliers, Bouwman & Drewes, 2009). The climate in Bojanala Platinum District Municipality (North West Province) is semi-arid and thus harsh. There is a short growing season, between October (last cold) and April (first frost). The District experiences severe cold and frost during winter months and hot weather during the summer months. Regular droughts also occur in the district. This all adds to the very challenging task of alleviating poverty and sustainable household food production. A greater part of the district experiences poverty rates of over 40% (Cilliers, Bouwman & Drewes, 2009). Based on the United Nations Human Development Index (HDI), the North West Province is one of the lowest of all the provinces in terms of quality of life (Tladi, Baloyi & Van Boom, 2002).

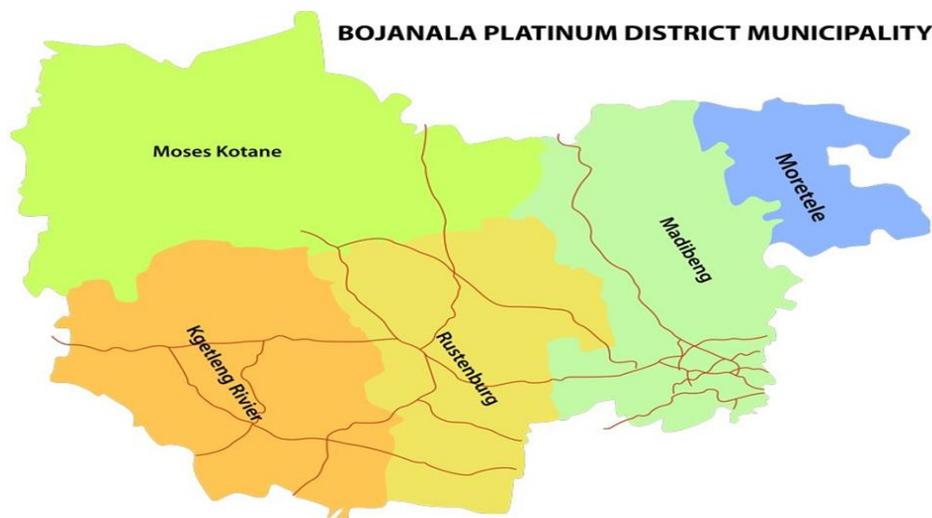


Figure 1: Map of Bojanala Platinum District Municipality (Available from: <http://mapserver2.statssa.gov.za/geographywebsite/africaGIS.html>)

3.3 Study design

A quantitative research approach was used in the study in order to solicit information related to the topic (Babbie & Mouton, 2012). A thorough analysis of existing literature was also done. In reviewing the literature, an attempt was made to demonstrate the contributions of this study to knowledge (Babbie & Mouton, 2012).

3.4 Data

Both primary and secondary data was used in the study. The primary data was collected by survey using a structured questionnaire.

3.5 Study population, sampling technique and sample size

The intention of the study was to cover most of the backyard gardens within the rural communities of Bojanala Platinum District Municipality. The researcher involved all relevant stakeholders and institutions in the study for reliable and easy access to information required for the study (The relevant stakeholders include the Department of Agriculture, Local municipalities and non-governmental organizations). Purposive sampling was used in the study in order to collect data from respondents. This technique enabled the researcher to select a sample of respondents who had the experience and knowledge about the variables of the study. Thus the sample size of 220 was selected from backyard gardeners in the study area.

3.6 Data collection

The study focused mainly on primary data which was collected through a survey. Secondary data from different sources such as journals, the internet, books, reports and magazines were used for the literature review. A structured questionnaire was developed as the main data collection instrument. The questionnaire was divided into sections informed by the specific objectives of the study. The questionnaire was pretested, validated and subjected to reliability test to improve the efficiency of the use of the questionnaire. The five respondents used for the pretesting of the questionnaire were not considered in the main survey.

3.7 Data analysis

According to Parahoo (2006), data analysis is an integrated part of the research design, and it is a means of making sense of data before presenting it in an understandable manner. Polit, Beck and Hungler (2001) refer to data analysis as the systematic organisation and synthesis of research data, and the testing of a research hypothesis using such data. After the data was collected, it was cleaned, coded, organised and analysed into descriptive statistics using the Statistical Package for Social Sciences (SPSS Version 23.0). Descriptive analysis enabled the researcher to reduce, summarise and describe quantitative data obtained from empirical evidence (Polit & Beck, 2008).

The main descriptive indicators employed are mean values, standard deviations, variances and frequencies. These are useful in analysing demographic and socio economic characteristics as well as the relationship between variables. Therefore, in general, descriptive statistics were used to analyse the demographic and socio economic characteristics of households engaged in backyard gardens; the contribution of backyard gardens to household income; job creation; food security; and the challenges inhibiting the development of Backyard gardens in the rural communities. Frequency tables were drawn and the data presented in tables, pie diagrams and bar graphs.

3.7.1 Inferential analysis

3.7.1.1 Assessment of factors that influence the generation of income from Backyard gardens

Factors that influence the generation of income from Backyard gardens of households were analysed using the Ordinary Least Square Multiple Regression Model.

The Model Specification

The Ordinary Least Square (OLS) regression model specification was employed to examine the demographic and socio-economic factors (predictors) that influence the generation of income from backyard gardens. The dependent variable, income, is

continuous. Therefore, the Ordinary Least Squares linear multiple regression model was used to model a continuous dependent variable. In this respect, the OLS estimates are: linear, unbiased, with minimum variance, consistent and normally distributed (Gujarati, 2003). The OLS model may be expressed as (Gujarati, 2003):

$$Y_i = \beta_0 + \beta_i X_i + \varepsilon_i \quad (1)$$

Where Y_i is the amount of annual income of growers, β_i are parameters to be estimated, β_0 is a constant and X_i are the demographic and socio-economic factors which influence the income of the farmer/grower as shown in Table 3.1. The Ordinary Least Squares principle states that the sum of the squares of the deviation for all values of population Y_i and sample \hat{Y}_i , is to be a minimum. i.e.

$$\sum_{i=1}^n (Y_i - \hat{Y}_i)^2 \quad (2)$$

where n is the number of data points comprising of the sample.

Since Y is considered to be dependent upon more than one variable, then,

$$Y_j = \alpha + \beta_1 X_{1j} + \beta_2 X_{2j} + \beta_3 X_{3j} + \dots + \beta_m X_{mj} + \varepsilon_j. \quad (3)$$

or, more succinctly

$$Y_j = \sum_{i=1}^m \beta_i X_{ij} + \varepsilon_j,$$

The model estimation

The sample regression equation, containing the statistics used to estimate the population parameters when there are m independent variables, would be

$$\hat{Y}_j = a + b_1 X_{1j} + b_2 X_{2j} + b_3 X_{3j} + \dots + b_m X_{mj} \quad (4)$$

$$Y_j = \alpha + \sum_{i=1}^m \beta_i X_{ij}. \quad \text{From equation (6), } b$$

can be determined as:

$$b = \frac{\sum xy}{\sum x^2} = \frac{\sum (X_i - \bar{X})(Y_i - \bar{Y})}{\sum (X_i - \bar{X})^2} = \frac{\sum X_i Y_i - \frac{(\sum X_i)(\sum Y_i)}{n}}{\sum X_i^2 - \frac{(\sum X_i)^2}{n}} \quad (5)$$

Then,

$$\bar{Y} = \alpha + \beta \bar{X}$$

and

$$\alpha = \bar{Y} - \beta \bar{X}$$

The best estimates of the population parameter α is the sample statistics

$$\alpha = \bar{Y} - b\bar{X} \quad (6)$$

All the endogenous variables were removed and the assumptions of linearity, normality, homoscedasticity and independent of error were considered, to ensure validity of the model. Autocorrelation and multicollinearity were checked by the Durbin-Watson statistic and the VIF values respectively. The Statistical Package for Social Sciences (Version 23.0) was used to analyse the OLS model and the parameter estimates provided included the following: Regression coefficient β , constant, standard error, R^2 , adjusted R^2 , VIF, Residual analysis, Durbin-Watson, t-values and the F-test.

Table 3.1: Variable labels and their expected effects

Independent variables	Variable description	Expected effect
X ₁	Gender	+
X ₂	Age	-
X ₃	Household dependents	+
X ₄	Level of education	+
X ₅	Employment	+
X ₆	Own farm	+
X ₇	Years of farming experience	+
X ₈	Engage in non-farm activities	+
X ₉	Household food secure	+
X ₁₀	Contribution of BYG to food security	+
X ₁₁	Proportion of BYG to income	+
X ₁₂	Size of BYG	+
X ₁₃	Farm the whole area of backyard?	+
X ₁₄	Quality of product	+
X ₁₅	Annual income from livestock sales	-
X ₁₆	Proportion output consumed	-
X ₁₇	Proportion of farm inputs purchased	+

X ₁₈	Do you have a reliable market?	+
X ₁₉	Vegetable production skills	+
X ₂₀	BYG problems get solved by extension officer?	+
X ₂₁	Do extension officers visit the garden?	+
X ₂₂	Number of permanent jobs created	+
X ₂₃	Do you hire seasonal labour?	+
X ₂₄	Do you have access to credit?	+
X ₂₅	Do you keep farm records?	+
Y (dependent variable)	Continuous variable: Amount of annual income of households from backyard gardens	

Source: Used data from the study

3.7.2 Factors influencing objectives of respondents regarding backyard farming

The multinomial logistic regression model was used to analyse factors influencing the objectives of respondents regarding backyard farming in the study area. The multinomial logistic regression model is scientific and appropriate for the set objective in that the dependent variable, which is the objectives of respondents regarding backyard gardening are measured at nominal levels. Thus, the objectives of respondents regarding backyard gardening with four categories are as follows: producing only for consumption; producing only for the market; producing for home consumption and the market; and producing to help the needy, the poor, to feed the orphans, and for home based-cares around their communities. Similarly, there are more independent variables that are continuous, ordinal or nominal (including dichotomous variables). However, the ordinal independent variables were treated as being either continuous or categorical as required.

It was also ensured that the independence of observations and the dependent variable were mutually exclusive and exhaustive categories. SPSS Statistics was used to test that there was no multicollinearity using Variance Inflationary factor (VIF) values in the output of the variables in multiple linear regression analyses. Multicollinearity occurs when one has two or more independent variables that are highly correlated with each other. This leads to problems with understanding which variable contributes to the explanation of the dependent variable and technical issues in calculating a multinomial logistic regression. There is a linear relationship between the continuous independent variables and the logit

transformation of the dependent variable; and there were no outliers, high leverage values or highly influential points.

It is worth mentioning that the objectives of respondents for engaging in backyard farming vary according to their respective socio economic characteristics. The model permits the use of a categorical dependent variable, and there are a number of alternatives that generate the probability (Aguilera-Alfred *et al.*, 1994). The model test consisted of four possibilities, P_j ($j = 1, \dots, 4$), associated with the categorical variable and the objective of respondent regarding Backyard gardening. The probability of respondent producing only for consumption is denoted by P_1 , the probability of respondent producing only for the market is represented by P_2 , the probability of respondent producing for both home consumption and the market is denoted as P_3 while respondent producing to help the needy, the poor, to feed the orphans, and for home based-cares around their communities (others) is represented as P_4 .

The maximum likelihood technique was used to estimate the following equation:

$$\log_e \left(\frac{p_j}{p_1} \right) = \alpha_j + \beta_{jk} X_{ki} + \mu_{ji} \dots\dots\dots (1)$$

where: $J = 1, 2, 3, 4$ categories;

$i = 1, \dots, n$ observations;

α = intercepts;

β = coefficients;

$X_k = 1, \dots, m$ explanatory variables; and

μ = error terms.

The estimation procedure generates the coefficients of the probabilities of an observation falling into three categories respectably. Alternative comparisons of other probabilities with different bases can be derived from:

$$\log_e \left(\frac{p_j}{p_k} \right) i = \log_e \left(\frac{p_j}{p_1} \right) i - \log_e \left(\frac{p_h}{p_1} \right) i \dots\dots\dots (2)$$

where $j = 3$ and $h = 2$, with j not equal to h simultaneously, and by using:

$$\log_e \left(\frac{p_j}{p_1} \right) i = (\alpha_j - \alpha_h) + (\beta_{jk} - \beta_{hk}) X_{ki} \dots \dots \dots (3).$$

The first set of estimated coefficients was used to calculate the probabilities of the objectives of respondents regarding backyard farming in the study area. The definition and explanation of variables used in the empirical multinomial logit model are presented in Table 3.2

Table 3.2: Definition and explanation of variables used in the empirical multinomial logit model

Variable	Type	Description and value	Expected sign
Objective of backyard gardens (Y _i)	Nominal	Produce only for consumption = 1 Produce only for the market = 2 Produce for both home consumption and the market = 3 Produce to help the needy, the poor, to feed orphans, and for home-based cares around communities (other) = 4	
Employed (X ₁)	Nominal	Employed = 1 Unemployed = 2	+
NFA (X ₂)	Nominal	Involved in nonfarm activities = 1 Not involved in nonfarm activities = 2	+
YRSBG (X ₃)	continuous	Number of years involved in backyard gardening	+

Source: Used data from the study. The 4th option of the dependent variable is the reference category

3.7.1.3 Determinants of proportion of backyard land used for backyard farming by respondents/growers

The logit regression model was used to analyse determinants of the proportion of backyard land used for backyard farming by respondents/growers. The Logit Model was used to model the dichotomous outcome of variables. The dependent variable was dichotomous – backyard farmers/growers either cultivated all their backyard land or they did not. In the

Logit Model, the log-odds of the outcome are modeled as a linear combination of the predictor variables. The logit function is specified as the inverse of the sigmoidal used in mathematics, particularly in statistics. When the function's parameter represents a probability p , the logit function gives the log-odds, or the logarithm of the odds $p/(1 - p)$.

The logit of a number p between 0 and 1 is given by the formula:

$$\text{logit}(p) = \log\left(\frac{p}{1-p}\right) = \log(p) - \log(1-p) = -\log\left(\frac{1}{p} - 1\right). \quad (3.1)$$

The "logistic" function of any number α is given by the inverse-logit:

$$\text{logit}^{-1}(\alpha) = \frac{1}{1 + \exp(-\alpha)} = \frac{\exp(\alpha)}{\exp(\alpha) + 1} \quad (3.2)$$

If p is a probability, then $p/(1 - p)$ is the corresponding odds; the logit of the probability is the logarithm of the odds. Similarly, the difference between the logit of two probabilities is the logarithm of the odds ratio (R), thus providing a shorthand for the correct combination of odds ratios simply by adding and subtracting:

$$\log(R) = \log\left(\frac{p_1/(1-p_1)}{p_2/(1-p_2)}\right) = \log\left(\frac{p_1}{1-p_1}\right) - \log\left(\frac{p_2}{1-p_2}\right) = \text{logit}(p_1) - \text{logit}(p_2). \quad (3.3)$$

So putting all this together, the key equation (usually termed the "multivariate logistic regression equation" or "multivariate logistic regression model") to which one fits the data is:

$$\log\left(\frac{p_i}{1-p_i}\right) = \alpha + \beta_1 X_{i1} + \beta_2 X_{i2} + \dots + \beta_p X_{ip} \quad (3.4)$$

where P_i is the probability and that Y_i is 1.

$P_i / (1 - P_i)$ are called the “odds”. In the analysis, the function is estimated with the maximum likelihood method and $Y = 1$ when the backyard gardener/farmer/grower cultivates all his or her backyard land; and $Y = 0$, when a gardener/farmer/grower does not. The independent variables considered in the study are presented in Table 3.3.

Table 3.3: Variable labels and their expected effects

Independent variables	Variable label	Expected effect
X ₁	Number of household dependents (continuous)	Positive
X ₂	Age (continuous)	Negative
X ₃	Income from BYG (continuous)	Negative
X ₄	Engage in non-farm activities (yes = 1, no = 0)	Positive
X ₅	Years of experience in gardening (continuous)	Positive
X ₆	Proportion of products consumed (continuous)	Positive
X ₇	Do you have a business plan? (yes = 1, no = 0)	Positive
X ₈	Are you a member of a cooperative? (yes = 1, no = 0)	Positive
X ₉	Own a farm besides BYG? (yes = 1, no = 0)	Positive
X ₁₀	Do you wish to lease your backyard? (yes = 1, no = 0)	Positive
X ₁₁	Proportion of farm inputs purchased (continuous)	Positive
X ₁₂	Do you have vegetable production skills (yes = 1, no = 0)	Positive

Source: Used data from the study

3.8 Ethical issues

The identities of respondents were kept confidential in the study. Permission to conduct the study was obtained from the district municipality in the study area. Participation by respondents was voluntarily via the use of approved consent forms. The interviews were done per convenient appointment with the respondents. All ethical protocols required by the College of Agriculture and Environmental Sciences of UNISA was complied with by the researcher.

3.9 Dissemination of information

The results of the study will be disseminated through conference presentations and the findings published in accredited journals and books.

3.10 Summary of chapter

Primary data was collected through a questionnaire while secondary data was obtained from role players involved in the project and from desktop information. The Statistical Package for Social Sciences (Version 23.0) computer programme was used in analysing the data. The descriptive statistics, Ordinary Linear Multiple Regression Model, the Multinomial Logistics Model and Logit Regression Model were used for the inferential analyses of the study.

CHAPTER FOUR

4.0 RESULTS AND DISCUSSIONS

4.1 Introduction

The study addressed the following researched questions: What are the contributions of Backyard gardens to household food security, job creation and income? What are the factors that impede the creation of income from Backyard gardens? What are the factors that prevent households from meeting the objectives of Backyard gardens of either producing solely for home consumption, the market or both or producing to assist the needy, the poor, feed orphans, and for home based-care around rural communities? What are the factors that influence the total area of backyard land used for backyard farming by households? and what are the challenges inhibiting the maximum development of Backyard gardens within communities? This chapter presents the results of the analysis and discussions of the study. The chapter is divided into four sections (1-4): the demographic characteristics of respondents; socio economic aspects of respondents; results and discussions of the inferential analysis; and a summary of the chapter.

4.2 Demographic characteristics of respondents

The importance of demographic and socio economic characteristics of respondents in a study cannot be over-emphasised. The findings of many researches have shown that demographic and socio economic characteristics impact on decision-making as well as most livelihood activities of farmers/growers. Table 4.1 shows the demographic characteristics of respondents selected in the study. Gender distribution in the study is higher in favour of females (68.2%) than males (31.8%). The majority of households visited had females as household heads. This correlates with the findings of Jacobi *et al.* (2000) that women tend to dominate in certain forms of cultivation (backyard gardens and small-scale animal husbandry) while men dominate in commercial food production.

In terms of age distribution, it was revealed in the study that 27.7% involved in backyard gardening are youth. The majority (60.4%) of respondents fall within 41-70 years age bracket. This is confirmed by Onyango (2010) and Maswikeng (2002) that older people

tend to participate actively in agriculture due to family responsibility and the need for food security at household level. Respondents aged 71 years and above represented 11.8%. The small percentage of elderly people who engage in farming may be as a result of poor physical health and the demanding nature of some of the activities.

The results in Table 4.1 show that 47.0% of respondents had between 1-4 occupants per household, and 45% of respondents had between 5-8 occupants, while 8.0% of respondents had 9-12 occupants per household. Approximately 45.0% of respondents had 1-5 dependents, 39% had 6-10 dependents, and 1.2% had 11-15 dependents while 3.2% had more than 16 dependents in their households. This shows that household members and dependents are likely to provide more family labour for backyard gardening activities.

The marital status of respondents is shown in Table 4.1. The majority (47.0%) of respondents were divorced while the remaining percentage was either married, single, widows and widowers respectively. According to Lundenberg (2005), there is a likelihood of women divorcing or separating from their partners through no choice of theirs. Men may decide to leave their female partners because of biological factors (something which they do not have any control over). In addition, an ethnographic study in rural Nigeria and Ethiopia suggests that a series of child deaths or childlessness in a marriage can precipitate divorce (Last, 1992; Dana & Ulla, 2000).

The educational background of respondents involved in the study is presented in Table 4.1. "Education is a key asset that determines household ability to access higher return activities (whether in agriculture or other sector) and escape poverty" (Maxwell, 1996). There is a serious need for rural communities to benefit from education and training in order to develop their capacities in terms of addressing their challenges and contributing to the local economy and development of the community. In a knowledge economy, given the direct relation between levels of education, income and productivity, such a situation will enhance sustainable development and food security. The majority (69.5%) of respondents were holders of the National Senior Certificate (NSC), 20.9% had tertiary education, and 3.6% had below the National Senior Certificate while 5.9% had no formal education. This confirms that majority of respondents had at least an entry level qualification to the employment sector, while the minority of respondents have below the

National Senior Certificate, an indication why employment might be a challenge for respondents.

Table 4.1: Demographic characteristics of respondents (n=220)

Variables	Frequency	Percentage
Gender		
Female	150	68.2
Male	70	31.8
Total	220	100.00
Age of respondents		
≤ 20	1	0.5
21 – 30	21	9.5
31 – 40	39	17.7
41 – 50	41	18.6
51 – 60	46	20.9
61 – 70	46	20.9
≥ 70	26	11.9
Total	220	100.00
Size of household		
1 – 4	104	47.0
5 – 8	99	45.0
9 – 12	17	8.0
Total	220	100.00
Number of dependents		
1 – 5	99	45.1
6 – 10	87	39.5
11 – 15	27	12.2
≥ 16	7	3.2
Total	220	100.00
Marital status of respondents		
Married	93	42.0
Divorced	103	47.0
Widow	11	5.0
Widower	13	6.0
Total	220	100.00
Level of education		
Below the National Senior Certificate	8	3.7
National Senior Certificate	153	69.5
Tertiary education	46	20.9
No formal Education	13	5.9
Total	220	100.00

Source: Used data from the study

4.3 Socio economic characteristics of respondents of the study

4.3.1 Employment status and sources of income of respondents

The results in Table 4.2 show that most respondents are unemployed (83.6%) while 16.4% are considered economically active. This could be due to lack of required skills and poor information sharing on employment opportunities towards rural people since they live far from the central business district (CBD).

Table 4.2 shows sources of income of respondents in the study area. The ability of households to generate income has a direct impact on food security and rural development. These have an impact on the willingness of respondents to engage in various types of agricultural activities.

Table 4.2 below shows that 32.7% of respondents depend on pension as their source of income, 12.3% depend on grants, 15.9% depend on monthly salaries, 0.5% depend on investments, 2.3% depend on remittance, and 18.5% depend on piece jobs, while 19.6% have other sources of income. According to the findings of the study, households that depend on pension money, salaries, grants and piece-jobs as their main source of income as well as households with no income are engaged in agriculture as opposed to households that depend on remittance, investment and other sources of income. The findings of the study revealed that income received by respondents is not sufficient to alleviate poverty, thus explaining why respondents engage in farming activities.

The results in Table 4.2 indicate that the majority (80.0%) of respondents in the study area earn R1 – R2000 monthly, 7.0% earn R2001 – R4000, 7.0% earn R4001 – R 6000, 2.1% earn R6001 – R8000, 0.3% earn R8001 – R10 000, 0.5% earn more than R10 001 while only 3.1% have 'no income' range. This is an indication that the majority of farming activities in rural communities of BPDM are subsistence in nature.

Land ownership in the study area is also shown in Table 4.2. The reform of an unequal distribution of land along racial divisions was one of the greatest challenges faced by South Africa during the transition to democracy in 1994. Popular expectations were high that the new democratic government would carry out fundamental transformations to address the historical dispossession of land. The 20 years of implementation of the Land Reform

Programme has seen several changes in strategy, the creation of numerous instruments to support redistribution, and more recently, a Recapitalisation and Development Programme to support the production of farms.

Despite years of Integrated Development Planning processes in the Bojanala Platinum District Municipality, issues of land reform and ownership patterns remain core challenges for the district. However, there are key challenges in BPDM that must be taken into account when implementing land use management policies. One such challenge is that of land ownership. Most of the land around BPDM has a high agricultural potential and can, therefore, contribute significantly to improve the lives of communities as well as eradicating poverty. Since economic growth and investment are directly linked to land ownership, it will be prudent for BPDM to ensure that good relationships are fostered with traditional authorities to impact on land redistribution and recapitalisation.

The results in Table 4.2 show that the majority (98.1%) of respondents did not own farms, 1.9% of respondents owned farms while only 1.4% stayed on the farms. About 2.2% of respondents travel less than 20 km from their residential areas to the farms while 0.5% travel more than 20 km. This contributes to low productivity in projects as respondents spend some of their time and resources travelling in and out of the farms daily. The fact that they do not stay on the premises of projects expose the projects to theft and vandalism of available assets and property.

The results in Table 4.2 also present the farming experience of respondents. The number of years spent in farming could serve as a measure of farming experience and as a direct indicator of production knowledge and individual expertise to some extent. Experience and knowledge when combined, could lead to better production (Chawda, 1978). Lack of agricultural experience may impact negatively on production, resulting in poor production and low volumes.

The results in Table 4.2 show that 23.6% of respondents had less than 5 years farming experience, 19.5% of respondents had between 6 to 10 years' experience, 10.5% of respondents had between 11 and 15 years of farming experience, 18.2% of respondents had between 16 and 20 years' experience, while 28.2% of respondents had more than 21 years of farming experience. This implies that the majority of respondents had substantial

years of experience in farming. Respondents are experienced and can fully understand the benefits of agricultural initiatives.

According to the findings, 18.1% of respondents were engaged in non-farming activities while 81.8% of respondents were engaged in both plant and animal production. Respondents involved in non-farming activities (18.2%) owned tuck-shop; some depended on construction work, sewing, catering, and entertainment for income and to provide for their families. This implies that backyard gardening has the potential to create sustainable livelihoods, generate income, enhance food security and provide a decent living wage to cater for the basic needs of households.

Table 4.2: Employment status and sources of income of respondents (n=220)

Variables	Frequency	Percentage
Employment status of respondents		
No	184	83.6
Yes	36	16.4
Total	220	100.00
Source of income		
Pension	71	32.7
Grants	27	12.3
Salary	33	15.9
Investment	1	0.5
Remittance	5	0.5
Piece jobs	41	18.5
Other	42	19.6
Total	220	100.00
Income earned (Rand)		
0	8	3.1
1 – 2000	177	80.0
2001 – 4000	16	7.0
4001 – 6000	11	7.0
6001 – 8000	5	2.1
8001 – 10000	1	0.3
≥ 10000	2	0.5
Total	220	100.00
Owning a farm		
No	216	98.1
Yes	4	1.9
Total	220	100.00
Stay on the farm		
No	217	98.6
Yes	3	1.4
Total	220	100.00
Distance from farm to place of residence		
< 20 km	5	2.2
>20 km	1	0.5

Do not stay on the farm	214	97.3
Total	220	100.00
Years of farming experience		
< 5 years	52	23.6
6 – 10 Years	43	19.5
11 – 15 Years	23	10.5
16 – 20 Years	40	18.2
Other	62	28.2
Total	220	100.00
Engaged in non-farm activities		
No	180	81.8
Yes	40	18.2
Total	220	100.00
Non-farm activities engaged in		
Sewing	8	3.6
Catering	5	2.3
Construction	11	5.1
Entertainment	16	7.2
Spaza (Tuck-shop)	179	81.3
Other	1	0.5
Total	220	100.00

Source: Used data from the study

4.3.2 Contribution of backyard gardening to household income and food security

Table 4.3 shows the contribution of backyard gardens to food security and household income. The food security of households is dynamic and influenced by a range of factors and elements that affect food supply, access, adequacy and cultural acceptability. Households can practise different farming activities to provide a variety of procurement strategies for food and income. The use of backyard gardens could be encouraged as a solution to food security and household income. Backyard gardens are beneficial not only in terms of food security but also have other benefits such as creation of employment in rural communities and a good source of income (Nair 1993; Finerman & Sackett, 2003).

The results in Table 4.3 show that the majority (99%) of respondents believe backyard gardens contribute a significant proportion to both household income and food security, while 1.0% do not agree. This confirms the fact that backyard gardens contribute significantly to both household income and food security. This finding is in line with that of Bonnard (2001) that agricultural interventions contribute to food security in several ways, including direct supply of crops and animal-based foods for consumption, creation of

employment opportunities and access to other non-farm foods through incomes from farm produce. Agricultural interventions could have a direct impact on food security if the diversification of production systems is encouraged through backyard gardening or home gardening, community gardening and the introduction of high value crops (Bonnard, 2001).

Table 4.3: Contribution of backyard gardens to household income and food security (n=220)

Variables	Frequency	Percentage
Backyard gardens contribute to household food security		
No	2	1.0
Yes	218	99.0
Total	220	100.0
Proportion of backyard gardens that contribute to household food security		
0	0.0	0.0
1 - 25%	64	30.3
26 – 50%	83	38.3
50 – 99%	71	30.3
100%	2	1.1
Total	220	100.0
Proportion of backyard gardens that contribute to monthly household income		
0	0.0	0.0
1 – 25%	32	14.5
26 – 50%	78	35.5
50 – 99%	81	36.8
100%	29	13.2
Total	220	100.0

Source: Used data from the study

4.3.3 Characteristics of backyard gardening among respondents

Table 4.4 presents information on backyard gardening of respondents in the study area. Land use management refers to development of land in support of the Bojanala Platinum District Municipality integrated development plan. The district municipality is spread over former homeland areas, commercial farms, towns and semi-urban areas, with large areas of land under the custodianship of traditional authorities. Some of this land has high agricultural potential and can, therefore, contribute to improving the lives of communities in the respective areas. According to the BPDM 2012 IDP, 32% of the total area of the district is under the control of traditional authorities.

The results in Table 4.4 also present the farming experience of respondents in the study area. The majority (61.8%) of respondents had 1 to 9 years farming experience, while

0.6% of respondents indicated that they started farming more than 41 years ago. Such difference in backyard gardening might be the reason why the production and household income of gardeners differed accordingly. Some older gardeners maintained that they started gardening more intensively in their retirement stage, while a few young respondents openly admitted that they dislike gardening duties because it makes one dirty. Some of the youth alluded that the older generation could be responsible for the failure in sustaining interest in gardening among young people.

The results in Table 4.4 further show documentation of land ownership in the study area. The concept of land ownership could be understood and practised differently in different cultures throughout the world. With different types of land ownership documentation that exist in South Africa, the findings of the study reveal that 39.1% of respondents had title deeds where their farming activities took place, 18.6% had permission to occupy the land either from the government or tribal authorities, 2.3% leased the land, 0.9% acquired the land through the Land Reform Programme while 39.1% acquired the land through the tribal authority in the study area. There is substantial evidence that access to land for the rural poor is essential for food security and economic development in developing countries. Such evidence applies to different countries and socio-economic situations (Maxwell, 1996).

The results in Table 4.4 reveal the size of backyard gardens of respondents in the study area. According to the results, 46.8% of respondents farmed on 21 to 50 square metre land, 28.2% farmed on 51 to 100 square metre land, 14.1% farmed on 11 to 20 square metre land, 4.1% farmed on 6 to 10 square metre land while 5.5% farmed on a 100 and more square metre land. Some respondents maintained that, at times, they fail to utilise the entire space of the garden due to various challenges encountered. The land size used for backyard gardens limits the gardener in terms of economic production, production of different varieties of vegetables, fruits and to obtain better yields.

As shown in Table 4.4, the majority (55.9%) of respondents established their backyard gardens with the objective of producing only for home consumption, 0.5% produced mainly for the market, while 43.1% produced for both home consumption and the market.

Approximately 0.5% of respondents produced to assist the needy, the poor, feed orphans, and for home-based cares around their communities.

The findings in Table 4.4 reveal that 40% of respondents could not manage to farm the whole area reserved for the garden while 60% were able to farm the entire area reserved for the garden. The results also show that 96% of respondents lease their land not for money; 1.3% were leasing their land for R1-R500; while 2.7% of them leased their land for R501-R1000 per annum. The results further reveal that 4.5% of respondents wished to lease some area of their land. However, the majority (95.5%) of respondents did not wish to lease their land.

Table 4.4: Characteristics of backyard gardening among respondents (n=220)

Variables	Frequency	Percentage
Number of years in farming		
0	1	0.5
1 – 9	136	61.8
10 – 18	38	17.2
19 – 30	31	14.0
31 – 40	13	5.9
≥ 41	1	0.6
Total	220	100.00
Land ownership document		
Tittle deeds	86	39.1
Permission to occupy land	41	18.6
Lease	5	2.3
Land reform programme	2	0.9
Traditional leader	86	39.1
Total	220	100.00
Size of the garden		
< 5 square metres	3	1.3
6 – 10 square metres	9	4.1
11 – 20 square metres	31	14.1
21 – 50 square metres	103	46.8
51 – 100 square metres	62	28.2
> 100 square metres	12	5.5
Total	220	100.00
Objective of backyard production		
Only for home consumption	123	55.9
Only for the market	1	0.5
Both 1 & 2	95	43.1
Other	1	0.5
Total	220	100.00
Farm the whole area of backyard garden		
No	88	40.0
Yes	132	60.0

Total	220	100.00
Proportion of backyard garden cultivated		
0	0.0	0.0
1 – 25	1	0.5
26 – 50	11	5.0
51 – 99	74	33.6
100	134	60.9
Total	220	100.00
Lease some area of backyard garden		
No	210	95.5
Yes	10	4.5
Total	220	100.00
Leasing amount (Rand)		
0	211	96.0
1 – 500	3	1.3
501 – 1000	6	2.7
≥ 1001	0	0.0
Total	220	100.00
Wish to lease some area of backyard garden		
No	210	95.5
Yes	10	4.5
Total	220	100.00

Source: Used data from the study

4.4 Production aspects of respondents regarding their Backyard gardens

Table 4.5 shows the production aspects of backyard gardens of respondents in the study area. About 45.9% of respondents across the district municipality engage in vegetable production, 1.8% engage in fruit production, 0.9% engage in grain production (mostly maize production), while 31.8% of respondents engage in both vegetable and fruit production. About 18.2% of respondents engage in both vegetable and grain production while 1.4% of respondents engage in both fruits and grain production. Considering specific types of production across the district municipality, vegetable production dominates in most households, followed by fruits and maize production respectively. This could be attributed to the fact that vegetable gardens provide a variety of food for the family all year round and improves income in the long-term through the sale of vegetables.

Table 4.5 shows the quality of food produced by respondents in the study area. Consumption of poor quality foods can have a long-term negative effect on household food security since it affects the health of members of the household. Children may suffer from lower cognitive development and poor performance at school. Such poor performers drop

out of school and are unable to secure well-paying jobs, becoming a burden on households. Mature household members receiving inadequate supplies of quality food become vulnerable to vitamin and mineral deficiency (Tracy-White, 2005). The findings from the study revealed that the majority (50.9%) of respondents produce food of good quality, 0.5% produce very good quality, 42.7% produce an average quality while 5.9% produce food of poor quality. This could be attributed to gardening dynamics encountered through farming activities. These findings are not in line with those of Shisanya and Hendriks (2011) that lack of crop diversity, coupled with low incomes are an indication that these households ate high quality foods sparingly.

Table 4.5 presents the income earned per annum, the proportion of food sold, the proportion consumed and the proportion of food lost in the study area. The results reveal that majority (58.3%) of respondents do not sell any portion of their produce from backyard gardening. They therefore produce for home consumption and other purposes. About 0.9% of the respondents sell their produce from BYG.

About 32.3% of the respondents earn an average income of R25 000 per annum from BYG, 2.3% earn R25 001 to R50 000 per annum, 3.2% earn R50 001 to R75 001 per annum, 1.3% earn R75 001 to R100 000 per annum, while 2.3% earn more than R100 001 per annum. This finding is in line with that of Galhena *et al.* (2013) that contribution to income generation, improved livelihoods, and household economic welfare, as well as promoting entrepreneurship and rural development could be achieved through farming initiatives (Galhena *et al.*, 2013).

Table 4.5: Production aspects of respondents regarding their backyard gardens (n=220)

Variables	Frequency	Percentage
Type of production in the backyard garden		
Vegetable production	101	45.9
Fruits production	4	1.8
Grain production	2	0.9
Vegetable & fruits production	70	31.8
Vegetable & grain production	40	18.2
Fruits & grain	3	1.4
Total	220	100.00
General quality of production per season		
Poor	13	5.9

Average	94	42.7
Good	112	50.9
Very good	1	0.5
Total	220	100.00
Income from produce per annum (Rands)		
0	129	58.6
1 – 25 000	71	32.3
25 001 – 50 000	5	2.3
50 001 – 75 000	7	3.2
75 001 – 100 000	3	1.3
≥ 100 001	5	2.3
Total	220	100.00
Proportion sold		
0	128	58.3
1 – 25	23	10.4
26 – 50	47	21.4
51 – 99	20	9.0
100	2	0.9
Total	220	100.00
Proportion consumed		
0	0.0	0.0
1 – 25	41	18.6
26 – 50	81	36.8
51 – 99	93	42.3
100	5	2.3
Total	220	100.00
Proportion lost		
0	25	11.4
1 – 20	35	15.9
21 – 40	87	39.5
41 – 60	56	25.4
60 – 81	17	7.8
Total	220	100.00

Source: Used data from the study

4.5 Livestock production aspects among respondents.

To be food secure, respondents need not only vegetables but also need livestock as a source of animal protein and income for other food requirements. Besides vegetable gardening, respondents also keep livestock.

Table 4.6 shows the general quality of livestock, income generated, and proportion sold, proportion consumed, as well as the proportion of losses incurred. The results show that 24.0% of respondents had an average quality of livestock, 2.8% had a good quality while

73.2% had a very good quality of livestock. This means that livestock production can contribute massively to the livelihood of agricultural households in BPDM.

Table 4.6 also presents the income generated from livestock production per annum. The majority (78.6%) of respondents did not earn an income, 16.8% earn R1 – R25 000 from the sale of livestock, 2.8% earn R25001 – R50 000 per annum, 0.9% earn R50001 – R99000 per annum, while the minority (0.9%) earn more than R100 000 per annum.

Table 4.6 further shows the proportion of animals sold per annum. The majority (79.1%) of respondents did not sell any of their livestock through-out the year, 5% sold (mostly chicken, goats and cows) 1 to 19 animals per annum, 7.7% sold 20 to 38 livestock per annum, 2.3% sold 39 to 57 per annum, 1.4% sold 58 to 76 livestock per annum, while 4.5% sold up to 95 livestock.

Table 4.6 also shows the proportion of animals consumed per annum. The majority (75%) of respondents did not consume any of their animals through-out the year, 20.4% consumed 1 to 25 animals (mostly chickens), 2.7% consumed 26 to 50 animals, 1.0% consumed 51 to 99 animals, while 0.9% consumed more than 100 animals through-out the year.

Table 4.6 also shows the proportion of animals lost per annum. The majority (96.4%) of respondents did not lose their animals, 1.8% lost 1 to 25 animals yearly, 1.4% lost 26 to 50 animals, while the minority (0.4%) lost 50 to 99 animals per annum. Majority of respondents maintained that animals are lost due to animal theft, sickness and drought experienced through-out the district.

Table 4.6 further shows the number of chickens owned by respondents per household. Chicken production by scale in the district municipality is mainly at subsistence level. The majority (82%) of respondents do not own chickens, 15% own 1 to 100 chickens, and 2.3% own 101 to 200 chickens, while the minority (0.5%) owns 400 to 500 chickens.

The results in Table 4.6 show the number of sheep owned by respondents per household. Sheep production by scale in BPDM is mainly at subsistence level. Commercial sheep production – viewed as household owning + 100 is relatively low in BPDM with 1.8% owning a minimum of 1 to 13 sheep and a maximum of 40 to 52 sheep per household. This is an

indication that there is need to support owners of sheep for them not to practise subsistence farming but to have the ambition to commercialise.

The results in Table 4.6 also show the number of goats owned by respondents per household. Goat production in BPDM is minimal, with little commercial activity reflected. The majority (89%) of respondents do not own goats, 5% of respondents own 1 to 14 goats, while 0.5 % own up to 70 goats per household. In absolute terms, only a minority (0.5%) engage in goat farming in BPDM.

The results in Table 4.6 show the number of cattle owned by respondents per household. Cattle production by scale in BPDM is mainly at subsistence level. Commercial cattle production – viewed as household owning +100 cattle is relatively low in BPDM. The majority (92.2%) of households not own cattle, 6.8% own 1 to 50 cattle while the minority (0.5%) own 150 to 200 cattle per household. Poor cattle production in the area could be attributed to cattle theft in BPDM. Cattle require intensive caring since drought is usually experienced in the entire district.

The results also indicate the number of pigs owned by respondents per household. Pig production in BPDM is minimal and largely at subsistence level. The majority (96.8%) of respondents do not own pigs, about 2.3% own 1 to 25 pigs, while the minority (0.9%) own up to 50 pigs per household.

Table 4.6: Livestock production aspects among respondents (n=220)

Variables	Frequency	Percentage
General quality of animals		
Average	53	24.0
Good	6	2.8
Very good	161	73.2
Total	220	100.00
Income received per annum (Rands)		
0	173	78.6
1 – 25 000	37	16.8
25 000 – 50 000	6	2.8
50 001 – 99 000	2	0.9
≥ 100 000	2	0.9
Total	220	100.00
Proportion sold		
0	174	79.1
1 – 19	11	5.0
20 – 38	17	7.7
39 – 57	5	2.3

58 – 76	3	1.4
77 – 95	10	4.5
Total	220	100.00
Proportion consumed		
0	165	75.0
1 – 25	45	20.4
26 – 50	6	2.7
51 – 99	2	0.9
100	2	1.0
Total	220	100.00
Proportion lost		
0	212	96.4
1 – 25	4	1.8
26 – 50	3	1.4
50 – 99	1	0.4
100	0	0.0
Total	220	100.00
Chicken production		
0	181	82.2
1 – 100	33	15.0
101 – 200	5	2.3
201 – 300	0	0.0
301 – 400	0	0.0
401 – 500	1	0.5
Total	220	100.00
Sheep production		
0	212	96.3
1 – 13	4	1.8
14 – 26	1	0.5
27 – 39	1	0.5
40 – 52	2	0.9
Total	220	100.00
Goat production		
0	196	89.0
1 – 14	11	5.0
15 – 28	10	4.5
29 – 42	1	0.5
43 – 56	1	0.5
56 – 70	1	0.5
Total	220	100.00
Cattle production		
0	203	92.2
1 – 50	15	6.8
51 – 100	1	0.5
101 – 150	0	0.0
151 – 200	1	0.5
Total	220	100.00
Pig production		
0	213	96.8
1 – 25	5	2.3
26 – 50	2	0.9
Total	220	100.00

Source: Used data from the study

4.6 Backyard garden inputs purchased by respondents

This findings in Figure 4.1 indicate that 13.2% of respondents could not purchase garden inputs due to lack of affordability, thus resulting in poor farm production. The majority (53.2 %) of respondents purchased up to 50% of farm inputs to improve production; 22.2% purchased 51 to 99% of farm inputs, 11.3% purchased 100% of farm inputs to achieve excellent production. This finding in line with that of Galhena *et al.* (2013) that backyard gardening is less cost-intensive and requires fewer inputs and investment. This makes backyard gardening extremely important for resource-poor households that have limited access to production inputs.

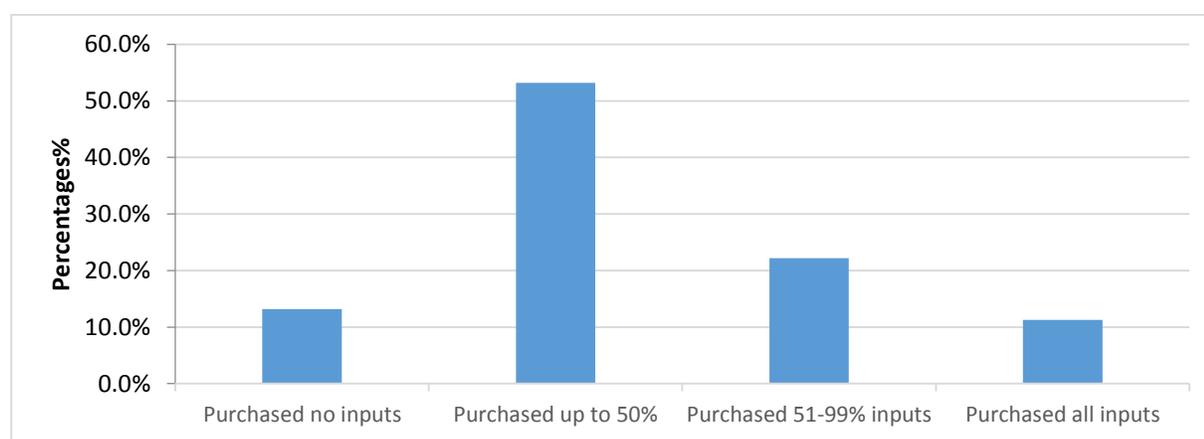


Figure 4.1: Backyard garden inputs purchased (n=220)

Source: Used data from the study

4.7 Market reliability

Figure 4.2 shows the market reliability and type of markets that are accessible for respondents in the study area. Access to markets has a direct impact on respondents. Respondents should be linked to all the markets (Local, National and Global markets) in order to acquire information on new technologies and secure high value markets for their produce. The majority (72.3%) of respondents rely on local markets for their produce, 4.5% rely on national markets, while 23.1% rely on other (community) markets for their produce. The majority (78.6%) maintained that they do not have reliable markets, while 21.4% confirmed they have reliable markets. According to IFAD (2003), assisting poor rural

people in improving their access to markets must be a critical element of any strategy to enable them to enhance food security and increase their incomes.

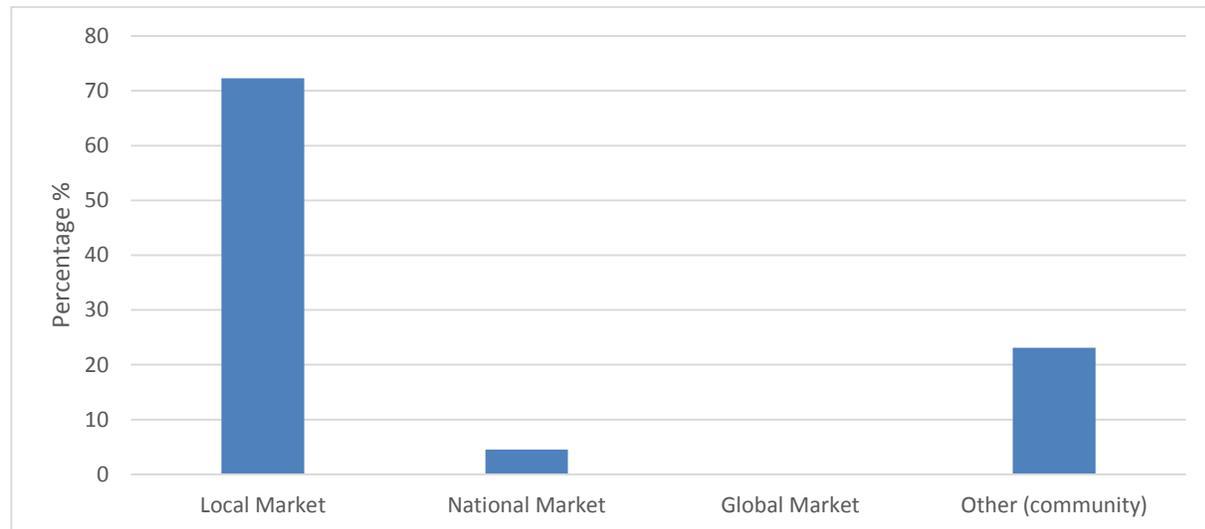


Figure 4.2: Market reliability (n=220)

Source: Used data from the study

4.8 Skills pertaining to gardening activities

The results in Table 4.8 show the different skills of respondents. One of the essential requirements for the success of agricultural production is skill development. The results reveal that only 0.5% of respondents do not have vegetable production skills while 99.5% of respondents are skilled. About 3.6% of respondents do not have fruit production skills while 96.4% are skilled; 2.7% of respondents do not have grain production skills while 97.3% are skilled; 6.4% of respondents do not have livestock production skills while 93.6% are skilled; 44.5% of respondents do not have marketing skills, while 55.5% of them have marketing skills. About 47.3% of respondents do not have financial management skills, while 52.7% of them have the skills; 48.6% of respondents do not have business management skills, while 51.4% of them are skilled. The findings in Table 4.7 reveal that the majority of respondents have the required skills, as a result, are capable of achieving optimum production. Respondents who have the required skill maintained that they received intensive training through various institutions, mostly from the Department of Agriculture.

Table 4.8 shows the type of training required by respondents. The majority of respondents engage in subsistence farming and depend on agriculture for their livelihoods. Approximately 27.2% of respondents indicated the need for training in plant production in order to improve farming production, while the minority (1.4%) suggested a need for training in marketing. The majority (70.5%) of respondents maintained that all types of production training are required to improve their farming activities. Rural households should be equipped with skills to ensure food security and improve income levels as well as utilising a broad range of training sources and methods in order to achieve optimal results.

Table 4.7: Skills pertaining to gardening activities (n=220)

Variables	Frequency	Percentage
Vegetable production skill		
No	1	0.5
Yes	219	99.5
Total	220	100.00
Fruit production skill		
No	8	3.6
Yes	212	96.4
Total	220	100.00
Grain production skill		
No	6	2.7
Yes	214	97.3
Total	220	100.00
Livestock production skill		
No	14	6.4
Yes	206	93.6
Total	220	100.00
Marketing skill		
No	98	44.5
Yes	122	55.5
Total	220	100.00
Financial management skill		
No	104	47.3
Yes	116	52.7
Total	220	100.00
Business management skill		
No	107	48.6
Yes	113	51.4
Total	220	100.00
How was the skill acquired?		
Trained	186	84.5
Other	34	15.5
Total	220	100.00

Training needed to improve gardening skill		
Training in production	60	27.2
Training in marketing	3	1.4
Training in financial management	2	0.9
All of the above	155	70.5
Total	220	100.00

Source: Used data from the study

4.9 Business plan and farming process

The findings in Table 4.8 show that the majority (80.9%) of respondents do not have a business plan, while the minority (19.1%) maintained they have business plans. About 15.9% of respondents indicated that they participated in developing their business plans. About 4.5% of respondents compared their production business plans (in most instances) with their farming process 3 to 4 times in a month to check if they were achieving the expected outcome; 13.6% compared their production business plans less than 2 times in a month; the majority (81.4%) of respondents did not compare their production plan with their farming process. The findings reveal that the absence of a business plan results in the failure to put in place suitable key indicators to measure production in relation to inputs, activities, outputs, outcomes and impacts.

Table 4.8: Business plan and farming process (n=220)

Variables	Frequency	Percentage
Possess a business plan		
No	178	80.9
Yes	42	19.1
Total	220	100.00
Participated in developing a business plan		
No	185	84.1
Yes	35	15.9
Total	220	100.00
Compare production business plan with farming process		
0	180	81.4
<2 in a month	30	13.6
3 – 4 times in a month	10	5.0
Total	220	100.00

Source: Used data from the study

4.10 Attending to and providing solution to challenges encountered by respondents

The results in Table 4.9 show the personnel who attend to and provide solutions to challenges encountered by respondents in terms of backyard gardening. Extension services in agriculture are indispensable as they offer a supplementary expert support in terms of improving production, processing, the flow of information, and transfer of knowledge and scientific findings to practice (Zivkovic *et al.*, 2009). Twenty-six point eight percent of respondents had their challenges addressed by extension officers, 0.9% had their challenges attended to by the ward councillor, while the majority (70.9%) had to provide solutions to their backyard garden challenges. The results show that agricultural extension services in BPDM has not achieved its objective of assisting households or farmers in addressing challenges of the methods and techniques of agricultural production in order to increase income, productivity and the quality of production in rural communities. The majority (53.7%) of respondents reported that extension officers never visited their gardens, while 46.3% had extension visits.

Table 4.9: Sources of personnel attending to and providing solutions to problems encountered from backyard gardens (n=220)

Variables	Frequency	Percentage
Attending to the problems		
Extension officers	59	26.8
Ward councillor	2	0.9
Self	156	70.9
Other	3	1.4
Total	220	100.00
Solution towards the problem		
No	20	9.1
Yes	200	90.9
Total	220	100.00
Official visit from extension officers		
No	118	53.7
Yes	102	46.3
Total	220	100.00
How often do extension officers visit the farming activities?		
Weekly	5	2.3
Every fortnight	21	9.5
Monthly	20	9.0
Quarterly	56	25.5
No visit	118	53.7
Total	220	100.00

Source: Used data from the study

4.11 Job creation / Labour information

The results in Table 4.10 show the type of employment created through backyard gardening. In many developing countries, agriculture is the main source of employment and income in most rural communities, where poor and hungry people reside. Creating employment through agricultural initiatives is critical in alleviating poverty and improving the living conditions of rural communities (by enhancing agricultural productivity for income generation by households). The findings of the study reveal that respondents have the potential to create both permanent and seasonal employment respectively. Through backyard gardening, 23.2% of the respondents created permanent employment while 34.1% of them created seasonal employment. Seasonal employment were normally created during land preparation, planting, weeding and harvesting periods. Respondents maintained that more employment opportunities could be created if projects function effectively and efficiently, through government intervention which could boost production and job creation.

Table 4.10: Job creation / labour information (n=220)

Variables	Frequency	Percentage
Permanent jobs		
0	169	76.8
1- 2	24	10.9
3 - 5	20	9.1
≥6	7	3.2
Total	220	100.00
Seasonal jobs		
0	145	65.9
1 - 2	45	20.5
3 - 5	19	8.6
≥6	11	5.0
Total	220	100.00
Seasonal workers hired every season		
No	144	65.5
Yes	76	34.5
Total	220	100.00

Source: Used data from the study

4.12 Information on economic viability

Table 4.11 shows accessibility by respondents to the various sources of credit. Agricultural credit enhances productivity and promotes the standard of living by breaking the malicious cycle of poverty of small-scale farmers. In respect of this, the provision of agricultural credit has become one of the most significant government initiatives in the promotion of rural agriculture (Olangunju, 2013). The results in Table 4.12 show that majority (97.3%) of respondents do not have access to credit. This could be attributed to lack of collateral or guarantor for bank credit while 2.7% have full access to bank credit. Access to credit requires collateral, either in the form of property or land ownership. Most respondents do not want to use their assets as security since they are scared to lose their properties should they fail to repay the credit.

The results in Table 4.12 also show the cooperative affiliation of respondents. Agriculture seems to be the main source of employment and income in most rural communities. Agricultural cooperatives play an important role in rural areas in terms of supporting small agriculture producers. They also empower them economically and socially through business models that are resilient to economic mainstream. The majority (70.5%) of respondents are not members of cooperative, while the minority (29.5%) are registered cooperative members. Respondents who belong to cooperatives maintained that cooperatives provide them with agricultural producer opportunities and a wide range of services, including improved access to markets, information, communication, training, credit and technology. Through this support, respondents are able to secure their livelihoods, thus contributing to poverty alleviation, food security and the eradication of hunger.

The results in Table 4.12 further reveal the number of respondents who keep production records. Record keeping skill is very critical in both emerging and commercial farming as it assists farmers in terms of making informed decisions on production, marketing and financial management of the farm. The majority (67.3%) of respondents do not keep records while the minority (32.7%) keep records. The findings reveal that the standard of record keeping in terms of production is very poor and might not serve a meaningful

purpose. This finding suggests that there is a need for training in record keeping across the district.

The findings in Table 4.12 present the project savings of respondents. The availability of appropriately designed financial management is an essential component of an enabling environment for rural economic growth and poverty reduction. The majority (54.1%) of respondents manage to save money from their produce while the minority (45.9%) maintained that it is difficult to save, due to high project needs (purchasing inputs) and household maintenance.

Table 4.11: Information on economic viability (n=220)

Variables	Frequency	Percentage
Access to credit		
No	214	97.3
Yes	6	2.7
Total	220	100.00
Member of farmer's cooperative or union		
No	155	70.5
Yes	65	29.5
Total	220	100.00
Record keeping		
No	148	67.3
Yes	72	32.7
Total	220	100.00
Savings from the project		
No	101	45.9
Yes	119	54.1
Total	220	100.00

Source: Used data from the study

4.13 Challenges encountered by respondents in the study area

In order to determine challenges and constraints affecting Backyard gardeners, respondents were asked during the interviews to identify challenges they perceived impede their farming business. Table 4.12 shows the challenges identified by respondents in the study area. Availability of water is critical to the growth and sustainability of agricultural projects. Water in households is used by both humans and livestock as well as for irrigation. Majority (89.6%) of respondents mentioned shortage of water as one of the major challenges affecting daily households and the operations of gardens, 82% of

respondents reported lack of inputs as one of the challenges hindering production while limited access and affordability of agricultural inputs as well as negative farmer's perception about improved agricultural inputs have contributed to the poor production. About 92.3% of respondents indicated that harsh weather conditions have deeply affected farming production. Eighty-two point four percent of respondents revealed that diseases were the most direct economic impact on production reducing farming income. Majority (90.0%) of respondents indicated that lack of finance is due to both lack of government support and inability to access credits from financial institutions caused by lack of assets and land ownership which can be used as security to secure loans. Most (72.4%) of respondents alluded that stray animals cause extensive damage to their production impacting on farming income.

Challenges encountered below 50% were considered minor and are presented in Table 4.13. The minor challenges encountered by respondents in the study area were as follows: Lack of fencing (44.5%); lack of interest in farming (5.9%); theft (42.5%); poor soil fertility (41.6%); poor storage (28.5%); and inappropriate business plan (18.1%).

Table 4.12: Challenges encountered by respondents in the study area (n=220)

Variables	Frequency	Percentage
Water	198	89.6
Lack of inputs	183	82.8
Lack of fencing	99	44.8
Lack of interest in farming	13	5.9
Harsh weather	204	92.3
Theft	94	42.5
Poor soil fertility	92	41.6
Poor storage	63	28.5
Destruction by animals	160	72.4
Diseases	182	82.4
Lack of extension officer	129	58.4
Inappropriate business plan	40	18.1
Lack of finance	199	90.0
Unavailability of market	35	15.8
Lack of infrastructure	68	30.8
Other	19	8.6

Source: Used data from the study

The mean values, standard deviation and variance of variables used in the regression model are presented in Table 4.14.

Table 4.13: Mean values, standard deviation and variance of variables used in the regression model (n=220)

	Variable	Mean	Std. Deviation	Variance
1	Gender (male =1, female =0)	.32	.467	.218
2	Age (continuous)	51.80	15.684	245
3	Number of household dependents (continuous)	7.16	3.991	16
4	Level of education	2.29	.632	.399
5	Employment (continuous)	.16	.371	.138
6	Own farm (Yes = 1, No = 0)	.02	.134	.018
7	Years of farming experience (continuous)	3.08	1.567	2.455
8	Engage in non-farm activities (Yes = 1, No = 0)	.20	.477	.227
9	Household food secure (Yes = 1, No = 0)	1.03	.308	.095
10	Contribution of BYG to household food security (continuous)	1.92	.784	.614
11	Proportion of BYG to monthly income (continuous)	2.50	.914	.836
12	Size of BYG (continuous)	4.13	.957	.915
13	Do you manage to farm the whole area of the backyard? (Yes = 1, No = 0)	.61	.516	.267
14	Quality of products (poor = 1, good = 2, very good = 3, excellent = 4)	2.43	.655	.429
15	Proportion of output consumed (continuous)	48.68	26.586	706
16	Annual income from sale of livestock (continuous)	4021	15588	24*10 ⁸
17	Proportion of farm inputs purchased (continuous)	1.62	1.166	1.359
18	Do you have a reliable market for products? (Yes = 1, No = 0)	.21	.411	.169
19	Do you have skills in vegetable production? (Yes = 1, No = 0)	1.00	.067	.005
20	Do your BYG problems get solved by extension officers? (Y = 1, N = 0)	.91	.288	.083
21	Do extension officers visit the garden? (Yes = 1, No = 0)	4.14	1.156	1.336
22	Number of permanent jobs created (continuous)	.39	.783	.613
23	Do you hire seasonal labour? (Yes = 1, No = 0)	.35	.477	.227
24	Do you have access to credit? (Yes = 1, No = 0)	.03	.163	.027
25	Do you keep farm records? (Yes = 1, No = 0)	.33	.470	.221
26	Amount of annual income of household from BYG (Y) (continuous)	10749	38473	15*10 ⁸

n = 220; Valid N (list-wise) = 215. Source: Used data from the study

4.14 Results and discussion of the inferential analysis

4.14.1 Factors influencing the annual income of Backyard garden of respondents in the study area

The results of the Ordinary Least Square linear multiple regression analysis of the effect of the set of explanatory variables on respondents' annual income from Backyard gardens are presented in Table 4.15.

Table 4.14: Results of the OLS linear multiple regression analysis (n=220)

Model	Unstandardized coefficients		Standardized coefficients	t	Sig.	Collinearity statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	-1947.426	2341.111		-.832	.407		
Gender	949.843	271.144	.187	3.503	.001	.752	1.330
Age	-10.236	10.427	-.068	-.982	.328	.441	2.265
Household dependents	-43.684	28.726	-.074	-1.521	.130	.894	1.119
Level of education	237.898	218.520	.062	1.089	.278	.662	1.511
Employment	1230.402	343.653	.195	3.580	.000	.722	1.386
Own farm	4701.738	967.011	.269	4.862	.000	.697	1.435
Years of farming experience	224.044	101.165	.149	2.215	.028	.472	2.117
Engage in non-farm activities	223.780	269.386	.044	.831	.407	.759	1.318
Household food secure	-28.631	735.678	-.002	-.039	.969	.954	1.049
Proportion of BYG to food security	64.566	153.485	.022	.421	.674	.813	1.230
Proportion of BYG to income	133.930	147.640	.052	.907	.365	.644	1.552
Size of BYG	-134.707	145.533	-.055	-.926	.356	.605	1.652
Do you manage to farm the whole area of your backyard?	-116.858	346.298	-.026	-.337	.736	.370	2.704
Quality of product	10.164	183.341	.003	.055	.956	.819	1.221
Annual income from livestock sales	.030	.004	.495	7.834	.000	.535	1.870
Proportion of output consumed	1.075	5.456	.012	.197	.844	.563	1.777
Proportion of farm inputs purchased	103.296	111.435	.051	.927	.355	.708	1.413
Do you have a reliable market?	-679.020	388.407	-.118	-1.748	.082	.468	2.137
Skills in vegetable production	676.999	1853.317	.020	.365	.715	.749	1.336
Do your BYG problems get solved by extension officers?	693.191	412.444	.085	1.681	.094	.829	1.207
Do extension officers visit the garden?	210.938	229.083	.057	.921	.358	.566	1.768
Number of permanent jobs created	-139.945	191.647	-.046	-.730	.466	.541	1.848
Do you hire seasonal labour?	508.939	281.458	.102	1.808	.072	.667	1.499
Do you have access to credit?	1202.083	804.733	.084	1.494	.137	.677	1.476
Do you keep farm records?	-472.208	302.512	-.094	-1.561	.120	.590	1.696

Dependent variable: Annual income from BYG, R=0.771, R²=0.600, Adj. R²=0.538, D=1.938, Std. error of the Estimate=1599.76, F=10.690, VIF=1.049-2.704. Source: Used data from the study

The co-efficient of determination, R-Square is 0.600 which implies that the independent variables account for 60.0% of the variation in the dependent variable (income from BYG). The Adjusted R-Square of 0.538 is reasonably close to the value of the R-Square 0.600, implying that the number of independent variables included in the regression was sufficient. Durbin-Watson statistic of the analysis is 1.938 which shows that there was no autocorrelation present. The F-Value is 10.690, and statistically significant (sig. 0.000). This is an indication that the combined effect of the independent variables on the dependent variable is very significant. All the respective Variable Inflationary Factors (VIF) of the Collinearity statistics are between 1.049 and 2.704; an indication that there was no multi-collinearity among variables.

The results of the OLS regression analysis revealed that gender of respondents had a positive and statistically significant influence (sig .001, $\beta = .187$) on the annual income from Backyard garden with all other factors held constant. The implication is that male Backyard garden producers earn 18.7% more annual income from Backyard garden than females. Respondents with formal employment in addition to Backyard garden had positive and statistically significant effect on the annual income from Backyard garden (sig .000, $\beta = .195$) with all other factors held constant. This implies that a unit increase in the employment variable would result in 19.5% increase in the annual income from Backyard garden, all other factors held constant. The reason for this effect may be due to the fact that income obtained from formal employment may be used by the farmer to acquire sufficient and appropriate Backyard garden tools and other relevant inputs/resources for expansion and improved productivity on Backyard garden.

Ownership of a farm, besides the Backyard garden (by respondent), also had positive and statistically significant effect on the annual income from Backyard garden (sig .000, $\beta = .269$) with all other factors held constant. Respondents who own farms, besides the Backyard garden, therefore, earn 26.9% more income than those who have only Backyard garden, with all other factors held constant. This may be due to the fact that such farmers might have acquired relevant farming experience and skills which are employed in Backyard garden, hence increased output and income. Income from farming activities may also be used to improve Backyard gardens through acquisition of the right

inputs/resources for Backyard gardens. Years of experience in farming had a positive and statistically significant effect on the annual income from Backyard gardens (sig .028, $\beta = .148$) with all other factors held constant. The results show that a unit increase in the number of years of farming will increase annual income from Backyard gardens by 14.8% with all other factors held constant. This may be attributed to the fact that farmers might have acquired substantial knowledge and skills in farming which are used in Backyard gardens, for increased output and income.

Annual income from the sale of livestock by respondents also had a positive and statistically significant effect on the annual income from Backyard gardens (sig .000, $\beta = .495$) with all other factors held constant. The results show that a unit increase in the income from the sale of livestock will increase annual income from Backyard gardens by 49.5% with all other factors held constant. This may be due to the fact that such farmers might have used some of the income from the sale of livestock to improve Backyard gardens through the acquisition of the right inputs/resources for Backyard gardens.

4.14.2 Results and discussion of the inferential analysis using the Multinomial Logistic Model

The results of the multinomial logit model used to analyse the factors influencing the objectives of respondents to practise backyard farming in the study area is presented in Tables 4.16, 4.17, 4.18, 4.19, 4.20 and 4.21. The Case Processing Summary in Table 4.15 shows how many cases or observations were in each category of the outcome variable (as well as their percentages). It also shows if there was any missing data. The marginal percentage lists the proportion of valid observations found in each of the outcome variable groups. Valid was 220 which indicates the number of observations in the dataset where the outcome variable and all predictor variables are non-missing. This was equal to the total implying that there were no missing values.

Table.4.15: Case processing summary (n=220)

		N	Marginal %
Objective of backyard gardens	Only for home consumption	122	55.5%
	Only for the market	1	0.5%
	Both (1) & (2)	95	43.2%
	Other (specify)	1	0.5%
Employment	No	183	83.2%
	Yes	37	16.8%
Engage in non-farm activities	No	179	81.4%
	Yes	41	18.6%
YRSBG		220	100%
Valid		220	100%
Missing		0	
Total		220	
Sub-population		220	

Source: Used data from the study

The Model Fitting Information in Table 4.16 shows the various indices for assessing the intercept only model (sometimes referred to as the null model) and the final model which includes all the predictors and the intercept (sometimes called the full model). Both the Akaike Information Criterion (AIC) and the Bayesian Information Criterion (BIC) are information theory-based model fit statistics. The -2 LL is a likelihood ratio and represents the unexplained variance in the outcome variable. Therefore, the smaller the value, the better the fit. The Likelihood Ratio chi-square test is the alternative test of goodness-of-fit. As with most chi-square based tests, however, it is prone to inflation as the sample size increases. Here, in the Table, the model fit is significant $\chi^2 = 23.081$, $p < .027$, which indicates that the full model predicts significantly better, or more accurately than the null model.

Table 4.16: Model fitting information (n=220)

Model	Model fitting criteria			Likelihood ratio tests		
	AIC	BIC	-2 Log likelihood	Chi-Square	Df	Sig.
Intercept only	203.300	216.874	195.300	23.081	12	.027
Final	204.219	258.517	172.219			

The first row in Table 4.17, labeled "**Pearson**", presents the Pearson chi-square statistic. A statistically significant result (i.e., $p < .05$) indicates that the model does not fit the data well. It can be seen from the Table below that the p -value is 1.000 (from the "**Sig.**" column) and is, therefore, not statistically significant. Based on this measure, the model fits the data well. The other row of the Table (i.e., the "**Deviance**" row) presents the Deviance chi-square statistic. These two measures of goodness-of-fit might be or not always give the same result.

Table 4.17: Goodness-of-Fit (n=220)

Goodness-of-Fit			
	Chi-Square	df	Sig.
Pearson	144.445	276	1.000
Deviance	116.580	276	1.000

Source: Used data from the study

There are three pseudo R-squared values in Table 4.18 below. Logistic regression does not have an equivalent to the R-squared found in OLS regression. Since these pseudo R-squared values or statistics do not mean what R-squared means in OLS regression (the proportion of variance of the response variable explained by the predictors), their interpretation are of less importance.

Table 4.18: Pseudo R-Square (n=220)

Cox and Snell	.100
Nagelkerke	.127
McFadden	.069

Source: Used data from the study

The Likelihood Ratio Test in Table 4.19 shows the independent variables which are statistically significant. It can be seen that YRSBG in the model is statistically significant at 5% level of significance.

Table 4.19: Likelihood Ratio Tests (n=220)

Effect	Model Fitting Criteria			Likelihood Ratio Tests		
	AIC of reduced model	BIC of reduced model	-2 Log likelihood of reduced model	Chi-Square	Df	Sig.
Intercept	204.219	258.517	172.219 ^a	.000	0	.
YRSBG	207.773	248.497	183.773	11.554	4	.021
EMPLO	199.875	240.598	175.875	3.656	4	.455
NFA	202.350	243.073	178.350	6.131	4	.190

Source: Used data from the study

Parameter estimates

The parameter estimates of the multinomial logistic regression analysis are presented in Table 4.20 below.

Table 4.20: Parameter estimates (n=220)

Objective of backyard gardens		B	Std. Error	Wald	df	Sig.	Exp(B)	95% Confidence Interval for Exp (B)	
								Lower bound	Upper bound
ONLY FOR HOME CONSUMPTION	Intercept	1.534	1.698	.816	1	.366			
	YRSBG	.010	.110	.009	1	.924	1.010	.814	1.254
	[EMPLO=1]	16.134	.377	1829.	1	.000	10.16x10 ⁶	4849995	21276766
	[EMPLO=2]	0	.	.	0	.	.	.	.
	[NFA=1]	15.891	.366	1887.7	1	.000	79.70x10 ⁵	3891942	16324213
	[NFA=2]	0	.	.	0	.	.	.	.
ONLY FOR THE MARKET	Intercept	-33.477	7714.2	.000	1	.997			
	YRSBG	-.038	.163	.055	1	.815	.963	.699	1.326
	[EMPLO=1]	31.723	5556.8	.000	1	.995	59.83x10 ¹²	.000	.
	[EMPLO=2]	0 ^c	.	.	0	.	.	.	.
	[NFA=1]	31.376	5350.8	.000	1	.995	42.30 x10 ¹²	.000	.
	[NFA=2]	0	.	.	0	.	.	.	.
BOTH (1) & (2)	Intercept	1.967	1.689	1.356	1	.244			
	YRSBG	-.040	.111	.131	1	.717	.961	.773	1.193
	[EMPLO=1]	16.052	.000	.	1	.	93.64x10 ⁵	9364559.	9364559
	[EMPLO=2]	0	.	.	0	.	.	.	.
	[NFA=1]	15.774	.000	.	1	.	70.91x10 ⁵	7091037.	7091037
	[NFA=2]	0	.	.	0	.	.	.	.

The reference category is: OTHER (Number of years involved in backyard gardening)

Source: Used data from the study

The parameter estimates in Table 4.20 shows the logistic coefficient (B) for each predictor variable for each alternative category of the outcome variable (alternative category meaning, not the reference category). The logistic coefficient is the expected amount of change in the logit for each one unit change in the predictor. The logit is what is being predicted; it is the odds of membership in the category of the outcome variable which has been specified. The Table also displays the standard error, Wald statistic, *df*, Sig. (*p*-value), as well as the Exp(B) and confidence interval for the Exp(B). The Wald test (and associated *p*-value) is used to evaluate whether or not the logistic coefficient is different than zero. The Exp(B) is the odds ratio associated with each predictor. It is expected of predictors which increase the logit to display Exp(B) greater than 1.0, those predictors which do not have an effect on the logit will display an Exp(B) of 1.0 and predictors which decrease the logit will have Exp(B) values less than 1.0. It can be seen from the results that a one unit change in number of years involved in backyard gardening does not significantly change the odds of being classified in the 4th category of the outcome variable relative to the first or second or third categories of the outcome variable, while controlling for the influence of the others. On the other hand, a one unit change in being employed and involved in non-farm activities do significantly change the odds of being classified in the 4th category of the outcome variable relative to the second or third categories of the outcome variable, while controlling the influence of the others.

4.14.3 Results and discussion of the inferential analysis using the Logit Model

The Logit Regression Model was used to analyse determinants of the proportion of backyard land used for backyard farming by respondents/growers. The findings in Table 4.21 show that 40% of respondents could not manage to farm the whole garden area, while 60% were able to farm the entire area reserved for the garden. This might have been influenced by many factors, including demographic and socio economic factors. The Logit Model was, therefore, used to determine these factors as presented in Table 4.21. The outputs from Backyard gardens will improve if these factors are addressed. The model summary of the results shows a very significant Chi-square test, an indication of the goodness-of-fit of the model. Out of the twelve independent variables used, nine were

found to have statistically significant influence on the proportion of available backyard land cultivated or committed to Backyard garden by respondents.

Table 4.21: Parameter estimates of logit regression of factors influencing the proportion of backyard land used for backyard farming by respondents/growers (n=220)

Variable	Estimate	Std. Error	Z	Sig.	95% Confidence Interval	
					Lower bound	Upper bound
Number of household dependents	.032	.013	2.396	.017	.006	.058
Age	.021	.004	5.538	.000	.013	.028
Income per month from BYG	.001	.000	9.831	.000	.000	.000
Engage in non-farm activities	.650	.078	8.275	.000	.496	.803
Years of experience in gardening	-.023	.006	-3.798	.000	-.034	-.011
Proportion of produce consumed	.015	.002	6.426	.000	.011	.020
Do you have a business plan?	.906	.135	6.729	.000	.642	1.169
Are you a cooperative member?	-.135	.123	-1.103	.270	-.376	.105
Own a farm besides BYG?	.978	.350	2.796	.005	.292	1.664
Do you wish to lease your backyard?	.004	.000	8.958	.000	.003	.005
Proportion of farm inputs purchased	-.078	.052	-1.512	.131	-.180	.023
Skills in vegetable production	-.591	.828	-.713	.476	-2.214	1.033
Intercept	-5.333	.880	-6.057	.000	-6.213	-4.453

LOGIT model: $\text{LOG}(p/(1-p)) = \text{Intercept} + \text{BX}$

Source: Used data from the study

Table 4.22: Chi-Square Tests (n=220)

	Chi-Square	df	Sig.
LOGIT Pearson Goodness-of-Fit Test	539.389	205	.000

Source: Used data from the study

The Logit coefficient estimate associated with the number of household dependents (Table 4.21) is positive and statistically significant, indicating that respondents increase their area of cultivation when there is an increase in the number of household dependents, with other

factors held constant. This may be due to the fact that respondents would like to cultivate a large area available for increased output to feed dependents.

The results in Table 4.21 show that the Logit coefficient estimate associated with the age of respondents is positive and statistically significant, indicating that available backyard land committed to Backyard garden increases with the increasing age of respondents, with all other factors held constant. This is consistent with the results of the demographic aspects of this study (Table 4.1) which indicates that the majority of respondents were above 40 years old.

The Logit coefficient estimate associated with income per month of respondents (Table 4.20) is positive and statistically significant, indicating that the increase in income per month from Backyard garden results in an increase in the area of cultivation with all other factors held constant. This may be due to the fact that respondents may be motivated with the increased income and, therefore, cultivate large areas available in order to increase monthly income.

The results in Table 4.21 show that the Logit coefficient estimate of engaging in non-farm activities is positive and statistically significant, indicating that the income generated from non-farming activities may be used to cultivate more area of farm/gardening land with other factors held constant. This is consistent with the results of the socio-economic characteristics of the study (Table 4.2) which indicates that respondents who engage in non-farm activities are able to earn income and provide for their families respectively.

The Logit coefficient estimate regarding years of experience of respondent in gardening (Table 4.21) is negative and statistically significant, indicating a negative correlation between years of experience and area of farm land under cultivation with other factors held constant. This may be due to the fact that respondents in the study may cultivate high value crops that do not require high area of cultivation and also that experienced gardeners may be involved in other businesses outside gardening.

The results in (Table 4.21) show that the Logit coefficient estimate associated with the proportion of produce consumed by respondents is positive and statistically significant,

indicating that increase in the proportion of products from gardening consumed results in an increase in the area of under cultivation with other factors held constant. This may be due to the fact that respondents produce for household consumption which reduces food expenditure.

The Logit coefficient estimate associated with the availability and use of business plans by respondents (Table 4.21) is positive and statistically significant, indicating that respondents who have business plans would cultivate more available land for backyard gardens with other factors held constant. This is consistent with the results of the business plan and farming process of the study (Table 4.9) which show that the absence of a business plan results in the failure to put in place suitable key indicators in order to cultivate a large area available to achieve increased output. The results in Table 4.21 reveal that the Logit coefficient estimate associated with a respondent's willingness to lease his/her backyard land to other interested individuals for cultivation was positive and statistically significant, indicating a positive relation between the two variables with other factors held constant.

4.15 Summary of chapter

This chapter has presented the results of analysis and discussions of the study. It was revealed that through the government interventions backyard gardens have potential to contribute economically through creating more employment opportunities once they function effectively and efficiently, which could boost the rural economy, agricultural activities and job creation, contributing to poverty eradication, household income and food security. The majority (99%) of respondents maintained that backyard gardens contribute a significant proportion to both household income and food security. This suggests that rural households should be equipped with relevant agricultural skills to undertake Backyard garden in order to ensure food security and improved income levels in the rural communities of Bojanala Platinum District Municipality (BPDM).

The results of the OLS regression analysis revealed that gender of respondents, formal employment, and ownership of a farm, besides Backyard gardens, farmers' years of experience in farming and annual income from the sale of livestock had positive and

statistically significant influence on the annual income from Backyard gardens with all other factors held constant.

The results of the multinomial regression analysis reveal that a unit change in number of years involved in backyard gardening does not significantly change the odds of being classified in the 4th category of the outcome variable (produce to assist the needy, the poor, feed orphans, and for home-based cares centers around their communities = 4) relative to the first, second or third categories of the outcome variable, while controlling for the influence of the others. On the other hand, a unit change in being employed and involved in non-farm activities do significantly change the odds of being classified in the 4th category of the outcome variable relative to the second or third categories of the outcome variable, while controlling the influence of the others.

The Logit coefficient estimate associated with Age, Income per month from BYG, Engage in non-farm activities, Years of experience in gardening, Proportion of produce consumed, having a business plan, Own a farm besides BYG and to lease your backyard have statistically significant impact on respondents area of cultivation for BYG with other factors held constant.

CHAPTER FIVE

5.0 SUMMARY, FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

The study was conducted to determine the economic contribution of backyard garden as a strategy to alleviate poverty in the rural communities of Bojanala Platinum District Municipality in North West Province, South Africa. The findings of the study reflects that backyard gardening contribute a significant proportion to both household income and food security.

5.2 Summary

The main objective of the study was to determine the economic contribution of Backyard gardens in alleviating poverty in the rural communities of Bojanala Platinum District Municipality in North West Province, South Africa. The objectives of the study were to: analyse the socio economic characteristics of households in the study area; determine the contribution of backyard gardens to household income of respondents and assess factors that impede the generation of income from Backyard gardens; analyse the contribution of Backyard gardens to the food security of households; assess factors influencing the objectives of respondents regarding Backyard gardens; assess the effects of Backyard gardens on job creation among households in the study area; and identify and analyse challenges inhibiting the development of gardens within the communities. The sample of the study (n=220) included respondents involved in Backyard gardens in all 5 local municipalities within Bojanala Platinum District Municipality. Purposive sampling was used in the study to collect data from participants since it enabled the researcher to select a sample with experience and knowledge on the study's variables. The questionnaire was pretested, validated and subjected to reliability test in order to improve the efficiency of its use. The collected data was sorted, coded and analysed using the Statistical Package for Social Sciences (Version 23.0) computer programme. Frequency counts and percentages were used to describe the data. The Ordinary Least Square (OLS) regression model specification was employed to investigate the effect of demographic and socio economic factors (predictors) that influence the income of Backyard gardeners. Multinomial logistics

regression model was used to determine factors that influence the decision of respondents to practise BYG. The logit regression model was also used to analyse determinants of the proportion of backyard land used for backyard farming by respondents/growers.

The findings of the descriptive statistics of the study were as follows: females (68.2%) are more active than males (31.8%); 27.7% of youth are involved in backyard gardening in the study area; the majority (60.4%) of respondents fall within the 41-70 years age group; the lowest (11.8%) age group that practised Backyard garden are those aged 71 years and above;

Majority (47.0 %) of respondents are divorced, 42% were married, 5% widow and 6% as widowers. About (69.5%) of respondents are holders of the National Senior Certificate, 20.9% have tertiary education, 3.6% have below the National Senior Certificate, while 5.9% have no formal education.

Most respondents are unemployed (83.6%), followed by those who are considered economically active who constitute 16.4%; majority (32.2%) of respondents depend on pension as their source of income, 12.3% depend on grants, 15% depend on monthly salaries, 0.5% depend on investments, 2.3% depend on remittance, 18.6% depend on piece jobs, while 19.1% reported other sources of income;

Majority (98.1%) of respondents do not own farms, 1.8% own farms, and only 1.4% stayed on the farms; 2.2% of respondents travel less than 20 km from their residential area to the farms, 0.5% travel more than 20 km;

Most (61.8%) of respondents have 1 to 9 years farming experience, and the minority (0.5%) reported that they started farming more than 41 years ago; majority (99%) of respondents reported that backyard gardens contribute a significant proportion to both household income and food security, while 0.9% do not agree; 39.1% of respondents have title deeds, 18.6% have permission to occupy the land either from the government or tribal authorities, 2.3% are renting the land, 0.9% acquired the land through the Land Reform Programme while 39.1% acquired the land through the tribal authority in the study area; 40% of respondents could not manage to farm the whole area reserved for the garden, while 60% were able to farm the entire area reserved for the garden;

About 26.8% of respondents had their challenges addressed by extension officers, 0.9% of respondents had their challenges attended to by the ward councillor, while the majority (70.9%) of respondents had to improvise solutions to their challenges in terms of backyard gardening; majority (53.7%) of respondents reported that extension officers never visited their gardens, while 46.3% had extension visits; 23.2% of the respondents created permanent employment while 34.1% of them created seasonal employment.

Results of the OLS regression analysis revealed that the gender of respondents, those with formal employment, ownership of a farm besides Backyard garden, farmers' years of experience in farming and annual income from the sale of livestock had a positive and statistically significant influence on the annual income from Backyard with all other factors held constant.

The results of the multinomial regression analysis revealed that a one unit change in number of years involved in backyard gardening does not significantly change the odds of being classified in the 4th category of the outcome variable (produce to help the needy, the poor, feed orphans, and for home-based care centers around their communities = 4) relative to the first or second or third categories of the outcome variable, while controlling for the influence of the others. On the other hand, a one unit change in being employed and involved in non-farm activities do significantly change the odds of being classified in the 4th category of the outcome variable relative to the second or third categories of the outcome variable, while controlling the influence of the others.

The Logit coefficient estimate associated with Age, Income per month from BYG, Engage in non-farm activities, Years of experience in gardening, Proportion of produce consumed, having a business plan, Own a farm besides BYG and to lease your backyard have statistically significant impact on respondents area of cultivation for BYG with other factors held constant.

5.3 Conclusion

The findings from the study clearly reveal that there is a lower percentage of men and youth involvement in Backyard gardening in the study area. Most of respondents are unemployed (83.6%) which suggests why rural people should be encouraged to start

Backyard gardens in order to eradicate poverty; income received by respondents is not sufficient to alleviate poverty, hence respondents should be encouraged to engage in farming activities. About 99% of respondents indicated that backyard gardening contribute a significant proportion to both household income and food security. About 40% of respondents could not manage to farm the whole area reserved for the garden due to poor extension support; the majority (70.9%) of respondents had to improvise personal solutions to challenges relating to their backyard gardens. Backyard gardens have the potential to create both permanent and seasonal employment; if the government could provide additional support to rural agriculture, more employment opportunities could be created and projects functioning effectively and efficiently, which could consequently boost production and the incomes of poor households.

The results of the OLS regression analysis revealed that gender of respondents, formal employment, ownership of a farm besides Backyard garden, farmers' years of experience in farming and annual income from the sale of livestock had a positive and statistically significant influence on the annual income from Backyard garden with all other factors held constant.

The results of the multinomial regression analysis revealed that a unit change in number of years involved in backyard gardening does not significantly change the odds of being classified in the 4th category of the outcome variable (produce to help the needy, the poor, feed orphans, and for home-based –care centers around their communities = 4) relative to the first or second or third categories of the outcome variable, while controlling for the influence of the others. On the other hand, a unit change in being employed and involved in non-farm activities do significantly change the odds of being classified in the 4th category of the outcome variable relative to the second or third categories of the outcome variable, while controlling the influence of the others.

The results of the logit regression analysis revealed that the Logit coefficient estimate associated with the number of household dependents, age of respondents, income per month of respondents from Backyard garden, engagement in non-farm activities, years of experience of respondents in Backyard garden, proportion of produce from Backyard garden consumed by respondents and the availability and use of business plans have

statistically significant influence on the proportion of available of land cultivated as gardens.

5.4 Recommendations

It is evident that most respondents from the study area are facing many challenges and constraints which hinder their development, growth and sustainable livelihood. Based on the findings of the study, the following recommendations are made:

The results of the analysis revealed that gender, employment and farm ownership have a significant and positive impact on annual household income of respondents. It is, therefore, important to encourage more men, formally employed people and those already engaged in farming to undertake Backyard garden in order to improve their income.

Since 99% of respondents indicated high income contribution from Backyard garden, the current unemployed youth in South Africa may be encouraged to develop interest and get involved in backyard gardening.

The analysis revealed that annual income from livestock has a significant and positive impact on annual household and income of respondents. It is, therefore, recommended that livestock farmers in the study area be encouraged to engage in backyard gardening since livestock production contributes massively to the livelihood of agricultural households.

The results of the analysis also revealed that market reliability in the study area has a significant and positive impact on food security and annual income of respondents. It is recommended that the government should assist poor rural people in order for them to have access to reliable markets and not to rely only on selling to poor communities, but to have full access to establish markets which will help them get value for money for their produce.

The results of the study show that rural households should be equipped with relevant vegetable production skills to ensure optimal results. However, people should be practically trained based on the required farming skills. It is recommended that the

government should be more involved in assisting rural communities through training programmes in order to improve the quality of products from backyard gardening.

The results of the analysis also revealed that the availability of business plans and their use have a significant and positive impact on the annual income of respondents. It is recommended that the government should assist rural communities with developing business plans for effective and efficient backyard gardening.

The results of the analysis further revealed that access to credit has a significant and positive impact on annual household income of. It is recommended that the government encourages agricultural credit in order to enhance productivity for better income, and improved standard of living by breaking malicious cycles of poverty in rural communities.

The results of the analysis revealed that record keeping has a positive significant impact on annual household income of respondents. It is therefore recommended that training in record keeping across the district among households or farmers be encouraged in order to serve a meaningful purpose.

The results of the multinomial regression analyses showed that a unit change in being employed and involved in non-farm activities do significantly change the odds of being classified in the 4th category of the outcome variable relative to the second or third categories of the outcome variable, while controlling the influence of the others. Therefore, owners of Backyard gardens in the study area should be encouraged to develop interest and get involved in other non-farm activities in order to raise income to support their vegetable gardening and to produce for the market.

The results of the logit regression analyses revealed that the Logit coefficient estimate associated with the number of household dependents, age of respondents, income per month of respondents from Backyard garden, engagement in non-farm activities, years of experience in Backyard garden, proportion of produce from Backyard garden consumed by respondents and the availability and use of business plans have statistically significant influence on the proportion of available land cultivated as gardens. The above factors should be considered in designing any programme to assist owners of Backyard garden in order to expand their area of cultivation for improved output and income.

6.0 REFERENCES

- Aguilera A. Baydas, M. & Meyer, R. 1994. Credit rationing in small-scale enterprises: Special micro-enterprise programmes in Ecuador, *Journal of Development Studies*, 31(2): 279–309.
- Alaimo K. Reischl T.M & Allen J.O .2010. Community gardening, neighbourhood meetings and social capital. *Journal of Community Psychology*, 38, 497-514.
- Allen P. 2003. Shifting plates in the agrifood landscape: the tectonics of alternative agrifood initiatives in California. *Journal of Rural Studies*, 19 (1) 61-75.
- Aliber M. 2003. Chronic poverty in South Africa: Incidence, causes and policies. *Journal of World Development*, 31 (3) 473-490.
- Babbie E. & Mouton J. 2012. *The Practice of Social Research: South African Edition*. Oxford University Press: Goodwood.
- Ban N. & Coomes O.T. 2004. Home gardens in Amazonian Peru: Diversity and exchange of planting material. *Geographical Review* 94(3): 348-367.
- Barker E.A, Motton F. & Seiler R. 2013. Creating community gardens to improve access among African Americans: *A partnership approach*. 8:516-32.
- Berry W. 1981. Solving for pattern: The gift of good land. Rodale Press periodical. The new farm.
- Bojanala Platinum District Municipality Growth and Development Strategy 2005.
- Bojanala Platinum District Municipality Integrated Development Plan 2012/13.
- Bonnard P. 2001. Improving the Nutrition Impacts of Agricultural Interventions: Strategy and Policy Brief. Washington, DC: Academy for Educational Development Food and Nutrition Technical Assistance Project.
- Buchmann C. 2009. Cuban home gardens and their role in social ecological resilience. *Human Ecology*, 37, 2039-2045.
- Christie M.E. 2008. *Kitchen space: women, fiestas, and everyday life in central Mexico*. Austin: University of Texas Press.
- Cilliers S.S. Bouwman H. & Drewes J.E. 2009. *Ecology of cities and towns: Comparative urban ecological research in developing countries*. Cambridge University Press.
- Chawda N.S. 1978. *Importance of experience in agriculture*. Yugharam. Raipur.

Dana T. & Ulla L. 2000. Divorce in Ethiopia: the Impact of Early Marriage and Childlessness. *Journal of Biosocial Science* 32: 355-372.

Department of Rural Development and Land Reform: Three years review of recapitalization and development programme Sep 2013.

FAO. 2002. The State of Food Insecurity in the World. Food and Agricultural Organization (FAO), Rome.

Farmer J. 2012. Leisure in living local through food and farming. *Leisure Science*, 34, 490-495.

Ferris J. Norman C. & Sempik J. 2001. People, land and sustainability: community gardens and the social dimension of sustainable development. *Social policy and Administration*, 35 (5), 559-568.

Finerman R. & Sackett R. 2003. Using home gardens to decipher health and healing in the Andes. *Medical Anthropol Quarterly* 17 (4) 459-482.

Foster S.R. 2006. The city as an ecological space: social capital and urban land use. *Notre Dame Law Review*, 82, 527-582.

Galhena D.H. Mikunthan G. & Maredia K.M. 2013. Home Gardens for Enhancing Food Security in Sri Lanka. *Farming Matters*. 28 (2) 12-26.

Gaynor A. 2006. Harvest of the suburbs: An environmental history of growing food in Australian Cities. Crawley: University of Western Australia Press.

Glover T.D. 2003. The story of Queen Anne Memorial Garden: resisting a dominant cultural narrative. *Journal of Leisure Research*, 35 (2) 190-212.

Glover T.D. 2004. Social capital in the lived experience of community gardeners. *Leisure Science*, 35 (26) 143-162.

Glover T.D. Shinew K. J. & Parry D.C. 2005. Association, sociability, and civic culture: The democratic effect of community gardening. *Leisure Science*, 27(1) 75-92.

Gottlieb R. & Joshi A. 2010. Food Justice. Cambridge, MA: MIT Press.

Gray L. Guzman P. Ann G. & Drevno G. 2014. Can home gardens scale up into movements for social change? The role of home gardens in providing food security and community change in San Jose, California, Local Environment: *The International Journal of Justice and Sustainability*, 19(2)187-203.

Gujarati D.N. 2003. Basic Econometrics. New York: McGraw Hill Book Co.

Head L. Muir, P & Hampel E. 2004. Australian backyard gardens and the journey of migration. *Geographical Review* 94(3)326-347.

- Hemingway J.L. 1999. Leisure, social capital, and democratic citizenship. *Journal of Leisure Research*, 31(2)150-165.
- Hinrichs C. 2000. Embeddedness and local food systems: Notes on two types of direct agricultural market. *Journal of Rural Studies*, 16(2)295-303.
- Hovorka A.J. 2004. Entrepreneurial opportunities in Botswana: (Re) Shaping urban agriculture discourse. *Journal of Contemporary African Studies* 22(3)367-388.
- Hunt J.D. & Bulmahn J.W. 1993. The vernacular garden. Washington: Dumbarton Oaks Research Library and Collection.
- Hurt R.D. 1998. The great plains during World War II. Lincoln, NE: University of Nebraska Press.
- IFAD (International Fund for Agricultural Development). 2003. The challenge of ending rural poverty: *Rural Poverty Report*. Oxford University Press, Oxford. June 23. ISSN 2222-1700 (Paper) ISSN 2222-2855.
- IFAD. 2011. Feeding future generations – Young rural people today, prosperous farmers tomorrow, plenary panel discussion, 34th session of the Governing Council, Rome.
- Jacobi P. Drescher A.W & Amend J. 2000. Urban Agriculture – a Response to Crisis. Proceedings of the International Conference on Urban agriculture and Horticulture, Berlin, July.
- Johnston J. 2003. Building a red green food movement. *Canadian Dimension*, 37(5) 6-8.
- Karaan A.S.M. & Mohamed N. 1998. The performance and support of food gardens in some townships of the Cape Metropolitan Area: An evaluation of Abalimi Bezekhaya. *Development Southern Africa* 15(1) 67-83.
- Kumar B.M. & Nair P.K.R. 2004. The enigma of tropical home-gardens. *Agroforest System*. 61(5) 35-152.
- Kimber C.L. 2004. Gardens and dwelling: People in vernacular gardens. *The Geographical Review* 94(3):263-283.
- Klindienst P. 2006. The earth knows my name: Food, culture, and sustainability in the gardens of ethnic Americans. Boston: Beacon Press.
- Lamont B.B. Le Maitre D.C. Cowling R.M. & Enright N.J. 1991. Canopy seed storage in woody plants. *Botanical Review* 57: 277-317.
- Last M. 1992. The Importance of Extremes: The Social Implications of Intra Household Variation in Child Mortality. *Social Science and Medicine* 35(6) 799-810.
- Lundberg S. 2005. Sons, Daughters, and Parental Behaviour. *Oxford Review of Economic Policy* 21 (3) 340-56.

- Marsh R. 1998. Building on traditional gardening to improve household food security. *Food Nutrition and Agriculture*, 22, 4-14.
- Martin J.F. White M.L. Reyes E. Kemp G.P. Mashriqui H. & Day J.W. 2000. Evaluation of coastal management plans with a spatial model: Mississippi Delta, Louisiana, USA. *Environmental Management* 26: 117–129.
- Maswikaneng M.J. 2002. Extension domain among urban farmers in Attredgeville. *Proceedings of the Agricultural Education Conference, May 26-30 2002, Durban, South Africa*.
- Maxwell S. 1996. Food Security: a post-modern perspective. *Food Policy, Elsevier*, vol. 21(2) 155-170.
- May J. & Rogerson C.M. 1995. Poverty and sustainable cities in South Africa: The role of urban cultivation. *Habitat International* 19:165-181.
- McClintock N. 2010. Why farm the city? Theorizing urban agriculture through a lens of metabolic rift. *Journal of Regions, Economy and Society*, 3(2) 191-207.
- McLaughlin P. & Merrett C. 2002. Community supported agriculture: Connecting farmers and communities for rural development. Macomb, IL: Illinois Institute for Rural Affairs.
- Mlozi M.R.S. 1996. Urban agriculture in Dar es Salaam: its contribution to solving the economic crisis and the damage it does to the environment. *Development of Southern Africa*, 13(1) 47-65.
- Molebatsi L.Y. Siebert S.J. Cilliers S.S. Lubbe C.A. & Davoren E. 2010. The Tswana tshimo: A home garden system of useful plants with a particular layout and function. *African Journal of Agricultural Research*. 5(19) 2952–2963.
- Mouton J. 2001. How to succeed in your Masters and Doctoral studies: A South African Guide and Resource Book. Pretoria: Van Schaik
- Nair P.K.R. 1993. An Introduction to Agroforestry. Dordrecht, The Netherlands: Kluwer Academic Publishers.
- Nell W. Wessels B. Mokoka J. & Machedi S. 2000. A creative multidisciplinary approach towards the development of food gardening. *Development Southern Africa* 17(5), 807-819.
- Olangunju F.I. 2013. Determinants of Access to Credit among Rural Farmers in Oyo State, Nigeria. *Global Journal of Science frontier Research Agriculture and Veterinary Science*. 13 (1) 2 – 3.
- Onyango C.L. 2010. Urban and peri-urban agriculture as a poverty alleviation strategy among low income households: The case of orange farm, South Johannesburg. Master Thesis, University of South Africa, Johannesburg, South Africa.

- Parahoo K. 2006. *Nursing Research: principles, process and issues*, 2nd ed. Houndmills: Palgrave Macmillan.
- Polit D & Beck C. 2004. *Nursing research: principles and methods*. 7th Edition. New York: Lippincott Williams and Wilkins.
- Polit D & Beck C. 2008. *Nursing Research: generating and assessing evidence for nursing practice* (8th Ed). Philadelphia: Lippincott Williams and Wilkins.
- Polit D, Beck C & Hungler B. 2001. *Essentials of nursing research methods, appraisal and utilization*. 5th Ed. Philadelphia: Lippincott.
- Pollan M. 1991. *Second nature: A gardener's education*. New York: Atlantic Monthly Press.
- Rahji M.A.Y. 2000. An analysis of the determinants of agricultural credit approval and loan size by commercial banks in Southern-western Nigeria. *Journal of Nigerian Development Studies*. 1 (1): 6 -25.
- Rakodi C.1995. Poverty lines or household strategies: A review of conceptual issues in the study of urban poverty. *Habitat International*, 19(4):407-426.
- Rogerson C.M. 1993. Urban agriculture in South Africa: Scope, issues and potential. *Geo Journal*, 30: 21 – 28.
- Rogerson C.M. 1993. Urban agriculture in Southern Africa: policy issues from the international experience. *Development Southern Africa* 10(1), 33-44.
- Ruel M.T.2001. Can food-based strategies help reduce vitamin A and iron deficiencies, a review of recent evidence. International Food Policy Research Institute Washington, DC.
- Schmelzkopf K. 1995. Urban community Gardens: lessons learned from California healthy cities and communities. *American Journal of Public Health*, 93, 1435-1438.
- Scott M.B. & Brutsch M.O. 1994. Evaluation of the trench bed method of vegetable growing in semi-arid areas. *Development Southern Africa* 11(2), 253-257.
- Shisanya S. & Hendriks S. 2011. The contribution of community gardens to food security in the Maphephetheni uplands. In Special Issue: Food security in southern Africa: *Responses to the problem of hunger*. *Development Southern Africa* 28, 509–526.
- Statistics South Africa (SSA). 2005. Geographic Information System, available at <http://mapserver2.statssa.gov.za/geographywebsite/africaGIS.html>, accessed April 2016.
- Statistics South Africa (SSA). 2012. Statistical release P0301.4, Census 2011. Embargoed until: 27 May 2015, 10:00. Pretoria: available at <http://www.statssa.gov.za/Publications/P03014/P030142011.pdf>, accessed March 2016.
- Thomasson D.A. 1994. Montserrat kitchen gardens: Social functions and development potential. *Caribbean Geography* 5(1) 20-31.

- Tladi B. Baloyi T & Van Boom E. 2002. The social environment. The state of the environment report 2002 of the North West Province, South Africa, (Eds), Mafikeng: North West Province, Department of Agriculture, Conservations and Environment.
- Tracy-White J .2005. Rural-urban market linkages: an infrastructure identification and survey guide, FAO.
- Taylor M & Jinabhai C. 2001. Working with community health workers to improve nutrition in rural Kwazulu-Natal. *Development Southern Africa* 18(2), 125-140.
- Van Vuuren C.J. 1988. Community gardens as food producing units. *Development Southern Africa* 5(1), 40-45.
- Vogl C.R. & Vogl L.B. 2004. Tradition, dynamics and sustainability of plant species composition and management in home gardens on organic and non-organic small scale farms in Alpine Eastern Tyrol. *Austria. Biological Agriculture and Horticulture*. 21: 149-166.
- Webb N. 1998. Urban cultivation: Food crops and their importance. *Development Southern Africa* 15(2), 201-213.
- Westmacott R. 1992. African-American gardens and yards in the rural South. Knoxville: University of Tennessee Press.
- Wilson A. 1992. The culture of nature: North American landscape from Disney to the Exxon Valdez. Cambridge: Blackwell.
- Winklerprins A.M.G.A. 2002. Recent seasonal floodplain-upland migration along the lower Amazon River, Brazil. *The Geographical Review* 92(3) 415–431.
- Winklerprins A.M.G.A. & De Souza P.S. 2005. Surviving the city: urban home gardens and the economy of affection in the Brazilian Amazon. *Journal of Latin American Geography*, 4. 107-126.
- Zivkovic D. Jelic S. & Rajic Z. 2009. Agricultural extension service in the function of rural development: The role of knowledge, innovation and human capital in multifunctional agriculture and territorial rural development, University of Belgrade, Serbia.

7.0 Appendix 1

Questionnaire

ECONOMIC CONTRIBUTION OF BACKYARD GARDEN IN ALLEVIATING POVERTY IN RURAL COMMUNITIES OF BOJANALA PLATINUM DISTRICT MUNICIPALITY IN NORTH WEST PROVINCE, SOUTH AFRICA.

Questionnaires to be completed by Backyard gardener's in Bojanala District Municipality.

Backyard gardener's free will and consent for their participation in the study will be respected. The study will carefully handle the interaction with backyard gardeners on the matter. Each backyard garden's information will be managed privately.

QUESTIONNAIRE FOR BACKYARD GARDENERS IN BOJANALA PLATINUM DISTRICT MUNICIPALITY.

1. PERSONAL INFORMATION OF THE GARDENER

- 1.1 Village.
 1.2 Gender.
 1.3 Age.....
 1.4 Household size.....
 1.5 Number of household dependants (food)?
 1.6 What is your marital status?
 1.7 Level of Education

No formal education	
Below Matric	
Matric education	
Tertiary education	

1.8 Are you employed? Yes No

1.9 What is your source of income

Source	Amount
Pension	R
Grant	R
Salary	R
Investment	R
Retailer	R
Remittance	R
Piece Jobs	R
Other (Specify)	

1.10 Do you own a farm? Yes No

1.11 Do you stay on the farm? Yes No

1.12 If no from question 1.7, how long is the distance of farm from house of residence?

Less than 20 km	
20-40 km	
More than 40 km	

1.13 Level of experience in farming?

Less than 5 years	
6 – 10 years	
11 – 15 years	
16 – 20 years	
Other (specify)	

1.14 Do you engage in non-farm activities? E.g. Spaza shop Yes No

1.15 If yes from 1.14 list/name them

1.16 Is your household food secured? Yes No

1.17 What proportion does backyard production contribute to your household food security?

0	
25%	
33.3%	
50%	
75%	
100%	

1.18 What proportion does your backyard garden production contribute to the monthly household income?

0	
25%	
33.3%	
75%	
100%	

1.19 What is the age distribution of your household?

Less than 5 Years	
6 - 12	
13 - 19	
20 - 26	
27 - 35	
Other (Specify)	

2. LAND/FARM INFORMATION

2.1 When did you start backyard gardening?

2.2 What kind of land ownership document do you have?

Title deed	
Permission to occupy the land (PTO)	
Lease or other specify	
Land Reform Program	
Traditional Leader	
Other (Specify)	

2.3 What is your garden's size?

Less than 5 square meter	
5-10 square meter	
11-20 square meter	
21-50 square meter	
51-100 square meter	
More than 100 square meter	

2.4 What is the objective of your backyard garden production?

(a) Only for home consumption	
(b) Only for the market	
Both (a) and (b)	
Other (Specify)	

2.5 Do you manage to farm the whole area of the backyard garden?

Yes or No

2.6 If no from question 2.5, what proportion of backyard do you cultivate?

0	
25%	
33.3%	
50%	
75%	
100%	

2.7 If no from question 2.5, do you take some area of your backyard to lease? Yes or No
 2.8 If yes from question 2.7, how much do you receive per square meter from leasing?

2.9 If no from question 2.7, do you wish to take some area of your backyard to lease? Yes or No

3. FARMING INFORMATION

31. Type of production in the backyard garden

Type of Production	Square Meter
Vegetable production	
Fruits production	
Grain production	
Vegetables & Fruits	
Vegetables & Grain	
Fruits & Grain	
Other (Specify)	

3.2 If you farm with plant production, what are those products and the quality of production per season? Please state.

Products	Quality (grade of the products)			Income per year	Proportion sold	Proportion consumed by household
	Poor	Good	Very good			

3.3 If you are farming with animal production, what are those and how many do you produce per circle or per year?

Products	Number /size	Quality			Number sold per year	Income from sales	Price per unit	Proportion sold	Proportion consumed by household	Do you add value		Others
		Poor	Good	Very Good						yes	no	
Broiler chicken												
Indigenous chicken (Layers)-eggs												

Sheep												
Goats												
Cattle												
pigs												
Other, specify												

3.4 What proportion of the farm inputs do you purchase?

0	
25%	
33.3%	
50%	
75%	
100%	

3.5 Do you have reliable markets for the products? Yes or No

3.6 Where do you market your products? Please indicate with X in the relevant blocks.

Local market	
National market	
Global market (export)	
Other, specify	

3.7 Do you have a market linkage? Yes No

.....

3.8 Has the project adopted a new technology? Yes No If yes please specify.....

3.9 Do you have skills pertaining to your gardening activities such as the following? Please indicate with X in the relevant blocks.

Skills	Yes	No	How was it acquired	
			Trained	Other(specify)
Vegetable production skill				
Fruits production skill				
Grain production skill				
Broiler production skill				
Layers production skill				
Livestock production skill				
Agro-processing skill				
Marketing Training				
Farm business management training				
Financial management training				
Other, specify				

3.10 Did you receive training for such skills? Yes No

.....

3.11 What training do you need to improve your gardening skills? Please mark with X the applicable blocks.

Production training	
Marketing training	
Farm business management training	

Financial management training	
Other, specify	

3.12 Do you have a business plan for your backyard garden? Yes or No

3.13 Did you participate in developing a business plan? Yes or No

3.14 How many times in a month do you compare your production business plan with your farming process to check if you stick on it? Please put X in the relevant box.

Less than 2	
3-4	
5	

3.15 What challenges do you face in your backyard farming activities? Please mark with X the applicable blocks.

	Tick the challenges facing your backyard gardening	Rank the critical three
Lack of water		
Lack of inputs		
Lack of fencing		
Lack of interest in farming		
Harsh weather		
Theft		
Poor soil fertility		
Poor storage		
Destruction by stray animals		
Diseases		
Lack of extension officers		
Inappropriate business planning		
Lack of finance		
Unavailability of market		
Lack of infrastructure		
Other,(Specify)		

3.16 Who attend to your problems?

Extension officer	
Ward Councillor	
Tribal authority	
Self	
Other (Specify)	

3.17 Do the problems get solution? Yes No

3.18 Do extension officers visit the garden? Yes No

3.19 If yes to 3.20, how often?

Weekly	
Fortnight	
Monthly	
Quarterly	

4. JOB CREATION/ LABOUR INFORMATION

4.1 How many permanent workers do you have in your backyard garden, and for which activity?

		Activity				
		Grazing	Land preparation	weeding	Harvesting	Marketing
Less than 2						
3-5						
6 or more						

4.2 How many seasonal workers do you hire per season, and for which activity?

		Activity				
		Grazing	Land Preparation	weeding	Harvesting	Marketing
Less than 2						
3 - 5						
6 or more						

4.3 Do you hire seasonal workers every season? Yes or No

5. ECONOMIC VIABILITY INFORMATION

5.1 Do you have access to credit? Yes or No

5.2 Are you a member of a farmer’s cooperatives or union? Yes or No

5.3 If yes from question 5.2, what services do you receive from the organisation?

5.4 Do you keep production, marketing and cash flow records? Yes or No

5.5 Does the project have savings? Yes or No

Thank you for your participation.