UNIVERSITY OF ZULULAND

The determinants of food security status among indigent rural households in the Isikelo community of the Mbizana local municipality, Eatern Cape Province

by

Vusi Mbewana

(**201152951**)

Dissertation submitted in fulfilment of the requirements for the degree of

Master of Commerce

in

Economics

in the

Faculty of Commerce, Administration and Law

University of Zululand

Supervisors: Prof. I. Kaseeram and Dr C.J. du Preez

January 2018

DECLARATION

I, Vusi Mbewana, declare that the work presented in this dissertation is my own work and the other sources that were used herein were duly acknowledged by means of referencing. This work is new and it has never been submitted in this or any other University for the purpose of obtaining a degree**.**

Vusi Mbewana

Signature: ……...

Date: ……....

ACKNOWLEDGEMENT

Firstly, I thank God the Almighty for giving me the strength to complete this project. My sincere gratitude goes to my supervisors, Professor Irrshad Kaseeram and Corie J. Du Preez who worked tirelessly to guide me during the writing of this dissertation. I really appreciate your supervision; without you, I wouldn't have completed this study. A special word of thanks goes to Professor Irrshad Kaseeram for his constructive criticism, support and motivation.

I want to thank the entire staff and my colleagues in the department of Economics for their support and encouragement. My appreciation also goes to my research assistants, Nomasista, Lulama, Siyasanga and Sinethemba, who worked with passion and who compromised their daily activities for the success of this project. Without, you I would not have gone this far.

I would also like to thank the editor, Helen Bond, for her help with the editing and proof reading of the dissertation.

Lastly, I would like to extend my deepest gratitude to my parent, Mrs G. Mbewana, and siblings, Mrs K. Khwezi, S. Mbewana, N. Mbewana, T. Mbewana, F. Mbewana, and Z. Mbewana, for giving me their support throughout this project.

DEDICATION

I dedicate this dissertation to my late father, M. A. Mbewana.

ABSTRACT

The Eastern Cape is the second largest province in the country, with high levels of poverty, and hence its rural areas, in particular, are considered to be highly food insecure. There is little known about the factors which determine the households' food security status in small rural towns such as Mbizana, a local Eastern Cape municipality mainly comprising of indigent households, for no such studies have been conducted in this area. The main objective of the study was to identify the relevant factors that affect the food security status of the households in the Isikelo community of the Mbizana local municipality. The study employed a systematic random method to select 330 participants to participate in a survey. The data collection occurred over the period of December 2016 to February 2017. The study used two binary logit models, where the first one estimated the determinants of household food security status using the dietary diversity scores, while the second model used the household food insecurity access scale (HFIAS) developed by USAID in 2007. In the first logit model, five variables were found significant and these variables included household social grants, gender, total monthly income, remittances, and membership in maize cooperative. In the second logit model, the results indicated that 10 of the 15 commonly used predictors that were included in the model, were found to be statistically significant. These variables included household size, government social grants, gender, marital status, total household monthly income, farm income, remittances, improved seed, and subsistence farming (own food production). Moreover, 62.0% of the sampled households were food insecure, whereas 38.0% of them were found to be food secure. In comparison, the dietary diversity scores showed that 52% of the households were food insecure, whereas 48 were found to be food secure. There is a significant discrepancy in these two measures of food security. However, the study prefers the household food insecurity access scale because it uses a norm of 30 days, unlike the dietary diversity scale, which uses the data of 24 hour recall. Based on the findings of the study, it is recommended that the government should introduce programmes that promote farm cooperatives, as well as subsistence farming. It is also recommended that government should finance small farmers in order to produce diverse agricultural products in rural areas, which will upgrade the income, as well as food security status, of the households in the relevant municipality.

TABLE OF CONTENTS

DECLARATION ii
ACKNOWLEDGEMENT iii
DEDICATION iv
ABSTRACT v
Xhosa questionnaire ..... 173 xi
LIST OF TABLES xi
LIST OF FIGURES xii
CHAPTER 1: INTRODUCTION AND BACKGROUND 1
1.1 Introduction 1
1.2 Problem statement 2
1.3 The aim and objectives of the study 3
1.4 Research questions 4
1.5 Research methodology 5
1.6 Intended contribution to the body of knowledge 5
1.7 Significance and justification of the study 6
1.9 Organisation of the study 7
CHAPTER 2: LITERATURE REVIEW 8
2.1 Introduction 8
2.2 Economic development in African continent 8
2.3 The progress of millennium development goals in Africa 9
2.3.1 Eradication of extreme poverty and hunger 9
2.3.2 Attainment of universal primary education 10
2.3.3 Promotion of gender equality and empowerment of women 10
2.3.4 Reduction of child mortality 11
2.3.5 Improvement of maternal health 11
2.3.6 Combating HIV and AIDS, malaria and other diseases 11
2.3.7 Ensuring the provision of environmental sustainability 12
2.3.8 Developing global partnership for development 12
2.4 Development theories 13
2.4.1 The neo-Malthusian theory 13

2.4.2 Techno-ecology theory 14
2.4.3 Modernisation theory 15
2.5 South African economic history 16
2.5.1 The natives land Act no. 27 of 1913 16
2.5.2 Native Trust and Land Act of 1936 17
2.5.3 Land issues in the apartheid period (1948-1993) 18
2.5.4 Land issues in post-apartheid period (1994) 19
2.6 Sustainable livelihood approach 22
2.6.1 Rural livelihood strategies and food security 22
2.6.2 Rural livelihood diversification and food security 23
2.7 Basic needs approach 23
2.8 Entitlement approach 24
2.9 Income based approach 25
2.10 Conceptual framework 25
2.10.1 Food availability 25
2.10.2 Food accessibility 26
2.10.3 Food utilisation 27
2.10.4 Food stability 27
2.11 Food security in a global context 27
2.12 Food security in Sub-Saharan Africa 28
2.13 Food security in South Africa 29
2.14 Food security measures 30
2.15 Poverty in South Africa 32
2.16 Conclusion 33
CHAPTER 3: EMPIRICAL LITERATURE REVIEW 35
3.1 Introduction 35
3.2 Determinants of household food security status 35
3.2.1 Household heads' education level 35
3.2.2 Age of household head 36
3.2.3 Marital status of the household head 37
3.2.4 Household size 37

3.2.5 Dependency ratio 38
3.2.6 Remittances 38
3.2.7 Monthly income/total household income 39
3.2.8 Household head employment status 39
3.2.9 Gender of household 40
3.2.10 Agricultural extension services 40
3.2.11 Farm income 41
3.2.12 Off-farm income 41
3.2.13 Farm size 42
3.2.14 Credit access 42
3.2.15 Improved seeds 43
3.2.16 Fertiliser application 43
3.2.17 Farming experience 44
3.2.18 Food Aid 44
3.2.19 Livestock ownership 45
3.2.20 Droughts 45
3.2.21 Farm inputs 46
3.2.22 Land quality 46
3.2.23 Climatic adaptation or irrigation 47
3.2.24 Distance to urban market 47
3.2.25 Floods 48
3.2.26 Distance from the main road 49
3.2.27 Ownership of assets 49
3.2.28 Family and hired labour 50
3.2.29 Insects/pests and diseases 50
3.2.30 Own food production 51
3.2.31 Output of food crops 51
3.2.32 The number of employed persons in a household 52
3.2.33 Household members in school 52
3.2.34 Food purchased from the market 53
3.2.35 Practising farming 53

3.2.36 Household membership of farm association 54
3.2.37 Conclusion 54
CHAPTER 4: RESEARCH METHODOLOGY 55
4.1 Introduction 55
4.2. Description of the study area and population 55
4.3 Research design 57
4.4 Sampling and sample size 58
4.4.1 Sampling techniques 58
4.4.2 Sampling design of the study 59
4.5 Instrumentation and data collection 61
4.6 Questionnaire design 62
4.7 Pre-tested questionnaire 63
4.8 The dietary diversity in relation to household food security status 63
4.9 Measurement of variables 65
4.9.1 Dependent variable 65
4.9.2 Household Food Insecurity Access Scale 66
4.9.3 Independent variables 68
4.10 The model 76
4.10.1 Logistic regression model 76
4.10.2 Model specification 77
4.11. Diagnostic tests 78
4.11.1 Hosmer-Lemeshow test 78
4.11.2 Wald statistic test 79
4.12 Conclusion 80
CHAPTER 5: RESULTS AND DISCUSSION 81
5.1 Introduction 81
5.2 Demographic characteristics of the sample households 81
5.3 Descriptive statistics from cross tabulations 84
5.3.1 Gender 85
5.3.2 Marital status 86
5.3.3 Education status 87

5.3.4 Remittances 88
5.3.5 Government social grants 88
5.3.6 Household size 89
5.3.7 Employment status 90
5.3.8 Household head age 91
5.3.9 Household's income 92
5.3.10 Subsistence farming (own food production) 93
5.3.11 Membership in farm cooperative 94
5.3.12 Land restitution programme 95
5.3.13 Farm income (only crops) 97
5.3.14 Livestock ownership 98
5.3.15 Improved seed 99
5.4 Dietary diversity score 99
5.5 The determinants of food security status of the first binary logit model 103
5.5.1 Discussion of results for the first logit model 104
5.5.2 Diagnostic tests for the first binary logit model 106
5.6 The determinants of household food security status for the second logit model 109
5.6.1 Discussion of results for the second logit model 111
5.6.2 Diagnostic tests for the second logit model 115
5.6.2.1 Hosmer-Lemeshow test 115
5.6.2.2 Wald test 116
5.7 Conclusion 118
CHAPTER 6: CONCLUSION AND RECOMMENDATIONS 119
6.1 Introduction 119
6.2 Summary of the study 119
6.4 Limitation of the study and future direction of research 124
6.5 Conclusion 125
LIST OF REFERENCES 126
APPENDICES 164
English questionnaire 164

Xhosa questionnaire ……173

Crosstabulations ……..182

LIST OF TABLES

Table: 4.1 Food groups 65
Table 4.2 portrays the predictor variables that were included in the binary logit model 69
Table: 5.1 Household heads demographic characteristics 82
Table: 5.2 Food security status and household head gender cross tabulation 85
Table: 5.3 Household head marital status cross tabulation 86
Table: 5.4 Household head education status cross tabulation 87
Table: 5.5 Food security status and household remittances cross tabulation 88
Table: 5.6 Food security status and household social grants cross tabulation 89
Table: 5.7 Food security status and household size cross tabulation 90
Table: 5.8 Household head employment status cross tabulation 91
Table: 5.9 Food security status and household total income cross tabulation..... 92
Table: 5.10 Food security status and age of the household head cross tabulation 93
Table: 5.11 Food security and subsistence farming cross tabulation 94
Table: 5.12 Household membership in a cooperative cross tabulation 95
Table 5.13 Food security status and land restitution programme cross tabulation 96
Table 5.14 Food security status and farm income cross tabulation..... 97
Table 5.15 Food security status and livestock ownership cross tabulation 98
Table 5.16 Food security status and use of improved seed cross tabulation 99
Table: 5.17 Categories of dietary diversity 100
Table: 5.18 The consumption pattern in the study area 101
Table: 5.19 The determinants of food security status of the sample households 104
Table: 5.20 Hosmer-Lemeshow test..... 107
Table: 5.21 Wald test for the first logit model 108
Table 5.22 Determinants of household food security status..... 110
Table: 5.23 Hosmer-Lemeshow test..... 116
Table: 5.24 Wald test for the second logit model 117

LIST OF FIGURES

Figure 4.1: Map 1: Mbizana Locality map showing ward boundaries (Mbizana local municipality IDP 2014/15 review) 57

CHAPTER 1: INTRODUCTION AND BACKGROUND

1.1 Introduction

The main aim of this study was to examine the determinants of households' food security status focusing on rural areas of the Mbizana local municipality. Food security is defined as the situation which occurs when all households at all times have economic and physical access to sufficient, safe and nutritious food for a good and healthy life (Grobler, 2013). It fundamentally depends on the interaction of four pillars which include availability, accessibility, utilisation and food stability (Jordaan, 2014). One of the most fundamental issues faced by the world today is how to ensure that millions of households who live in poverty can be granted access to adequate food of the best possible quality (Adekunle, 2013). It was observed by Westaway (2012) that the Eastern Cape, the second largest province within the Republic of South Africa, is severely affected by widespread poverty, especially in the rural areas, as a result of the apartheid legacy. Hence, an assessment on food security risks among such indigent communities is critical from a developmental perspective.

In addition, there is little known about the factors that influence the food security status in small towns such as Mbizana, a local municipality which is situated in the Alfred Nzo district of the Eastern Cape Province. This municipality is characterised as the area that comprises the indigent households whose livelihood depends on agriculture and hence are considered to be highly food insecure. Empirical evidence shows that one of the causes which exacerbated food insecurity around the world was the sudden rising food costs in 2007 which had negatively short and long term effects on food security and also pushed the poor households further into poverty and hunger (Gustafson, 2013).

Moreover, it was observed that global food insecurity was associated with an increase in hunger (FAO, 2006; FAO, 2017). According to Jones *et al.* (2013) when food scarcity increases, it signifies the severity of food insecurity. The challenge of food insecurity and under-nutrition were found to be more widespread in developing countries (Mbwana *et al.,* 2016). The number of undernourished people rose sharply in the world between 2006 and

2009 due to high food prices and global economic crisis. However, in the year 2010 the number of undernourished people was expected to decrease considerably as the global economy recovered, but instead, it remained unacceptably high (FAO, 2010; FAO, 2015).

In Asia and the Pacific, there were 578 million undernourished people which was the highest compared with other regions. This was

followed by Sub-Saharan Africa with 239 million, Latin America and the Caribbean with 58 million, Near East and North Africa with 37 million, and developed countries with 19 million undernourished people (FAO, 2010). In the year 2012, food insecurity was regarded as a major global concern which made it challenging to reach the first-Millennium Development Goal of halving extreme poverty and hunger by 2015. In the same year, one billion people in the world were suffering from malnutrition and starvation and the African continent, especially the Sub-Saharan region, has experienced severe food insecurity over the past 50 years (Sasson, 2012). In previous years, Africa has endeavoured to find ways of resolving the problem of food insecurity (Omotesho *et al.,* 2007).

D'Haese *et al.* (2013) examined the food security status in the rural areas of KwaZulu-Natal. These researchers reported that food insecurity is still high in the poor areas of KwaZulu-Natal and most of the rural households in the province are struggling to access adequate food. The study by Tibesegwa and Visser (2015) determined that the prevalence of food insecurity was found mainly in female-headed households who reside in rural areas compared to male-headed households who live in urban areas.

The prevalence of food insecurity is the concern of South African households and this pressing concern is connected to high poverty levels observed in the country, specifically in rural based communities (Abdu-Raheem & Worth, 2011). In addition, the poverty rates in the Mbizana local municipality was estimated at 88.12% in 2006 which declined to 83.60% in 2016 (MLMSER & O, 2017). According to Du Toit *et al.* (2011), there is a direct link between poverty and household food insecurity.

1.2 Problem statement

There is no study that has been conducted in the Isikelo community of Mbizana local municipality to investigate the determinants of food security status of the rural indigent

households. The study by Zithutha (2010) is the only study which came close to investigating food security issues in the Mbizana area, however, the above-mentioned author mainly focused on the role played by small-scale farming in poverty reduction.

Moreover, the studies that have been undertaken in the Eastern Cape Province were conducted in other districts, such as the Mhlontlo local municipality, under the OR Tambo district municipality which lies more than 130 km from the Mbizana local municipality. In addition, the Mhlontlo study used the qualitative methodology involving a sample size of only 35 households to assess the factors that contribute to food insecurity (selepe *et al.* 2015). However, the extent of financial support from central government's or non-government organisation to set small agro-businesses to enhance food security in rural areas remained unexplored. The current study employed a sample size of 330 participants and the statistical data was analysed through the quantitative approach involving a logistic regression model and, hence, is expected to achieve more robust findings.

1.3 The aim and objectives of the study

In light of the above, the aim of this study was to investigate the determinants of food security status of the indigent rural households in the Isikelo community of Mbizana local municipality and to further understand the dietary diversity pattern in the area.

The specific objectives of the study are:

- To assess the dietary diversity pattern among the rural indigent households in the study area.
- To examine the determinants of food security status of the rural indigent households in the above-mentioned municipality. Stemming from this objective, the following sub-objectives were derived:
    - To assess whether the level of household total income influence the food security of the rural indigent households.
    - To establish whether the household size in the study area influences the food security of that household.
    - To find out if education affects the food security status of the above-mentioned households.

- To determine if the gender of the household head impacts the household's food security in the study area.
- To assess if the employment status of the household head influences the food security of the household.
- To determine whether remittances affect the food security status of a household?
- To assess if government social grants influence the food security of the above-mentioned households.
- To calculate whether subsistence farming affects the households' food security in the study area.
- To estimate if farming income influences the households' food security status in the Mbizana municipality.
- To establish if membership in a farming cooperative affects the food security status of the said municipality.

1.4 Research questions

- What is the dietary diversity pattern among the rural indigent households in the study area?
- What are the determinants of the food security status of the rural indigent households in the above-mentioned municipality? Stemming from this research question, the following sub-questions were derived:
  - To what extent does the level of household total income influence the food security of the rural indigent households?
  - Does the household size in the study area influences the food security of a household?
  - Will the householder's education level affect the food security status of the above-mentioned households?
  - Does the gender of the household head impact the household's food security in the study area?
  - To what degree does the employment status of the household head influence the food security of the household?

- Do remittances affect the food security status of a household?
- To what extent do government social grants influence the food security of the above-mentioned households?
- Does subsistence farming affect the households' food security in the study area?
- Does farming income influence the households' food security status in the Mbizana municipality?
- Does membership in a farming cooperative affect the food security status of the said municipality?

1.5 Research methodology

The current research study employed cross sectional data in order to determine the factors that influence the food security status of the indigent rural households in the Isikelo community of Mbizana local municipality. The statistical data were collected through the use of structured and self-administered questionnaires. To this end, the questionnaire was translated into IsiXhosa as it is the main spoken language in the study area. A systematic random sampling technique was used to select the participants in the above-mentioned community.

The determinants of food security were analysed through the use of descriptive statistics such as cross tabulation, a chi-square method and a logistic regression model which assisted in terms of finding the most important factors that influence the households' food security status of the sampled population. Moreover, a detailed methodological framework will be discussed in Chapter 4 of this dissertation.

1.6 Intended contribution to the body of knowledge

Food security status has been extensively investigated in South Africa but there is no study that has been conducted in the above-mentioned municipality and even at district level. This research will make a worthwhile contribution to the field of economics and more specifically with reference to the Mbizana area, because none of the previous researchers have paid attention to the government or NGOs' financial support in small scale farming (small agro-businesses) to enhance the food security of the rural-based residence. In addition, this

research study sought to examine the determinants of households' food security status, focusing on rural areas of the specific municipality.

1.7 Significance and justification of the study

South Africa is characterised as food secure at the national level, but the households residing in rural areas are suffering from severe food insecurity (Selepe *et al.,* 2015). This is supported by the Department of Agriculture (2012), which attested that nearly 50% of the households living in rural areas are more exposed to the prevalence of food insecurity than those residing in urban areas. Moreover, the Mbizana local municipality reflects a poverty rate as an estimated 83.60% (MLMSER & O, 2017).

The high poverty level in the Mbizana local municipality is one of the causes of food insecurity which was identified from the existing literature. It is very important for this study to be undertaken to investigate the determinants of food security status. These findings will shed light on the dynamics involved that will help local authorities to develop appropriate policy responses to reduce or eradicate the poverty and food insecurity that prevails in the said municipality and other similar rural local authorities countrywide.

1.8 Ethical and safety issues

I understood that it was necessary to abide by the University policies and obligations imposed upon me and to mitigate any other risks that might have arisen. In particular, I understood that I should:

- Keep the information given by the participants confidential that all publications emanating from this study only mentioned broad trends and patterns in the data without mentioning individuals involved.
- Avoid writing names on the questionnaires, but rather used a code.
- Explain to the participants that they could withdraw from the survey at any time and they did not have to answer questions with which they were unhappy.
- Alert participants about their rights and whom they could call should they have any queries or complaints.
- Share the location of where all the information gathered would be stored.

1.9 Organisation of the study

Chapter 1: The introduction of the study

This chapter gives an overview of the current research study. Firstly, it deals with the background of the study, followed by the problem statement, the aim, and objectives of the study, research questions, intended contribution to the body of knowledge, the significance of the study and research methodology that was employed to achieve the objectives of the study.

Chapter 2: Literature review

In this chapter, the theoretical and conceptual issues are discussed in detail to find out the theories and concepts that underpin household food security status. This chapter also discusses food security measures.

Chapter 3: Empirical literature review

This chapter reviews the studies that have been undertaken in South Africa and in other countries. The chapter reveals the variables that predict the household food security status.

Chapter 4: Research methodology

The purpose of this chapter is to provide the methods that were used in data collection up to the analysis of data. These methods are discussed in detail in the methodology section.

Chapter 5: Analysis and interpretation of results

The purpose of this chapter is to provide a detailed analysis of the findings based on the household food security status of the rural indigent households in the Mbizana local municipality. In this chapter, the determinants of food security status in the above-mentioned study area were estimated.

Chapter 6: Conclusion and recommendations

Firstly, this chapter summarises the study. Secondly, it draws a conclusion and gives sound and relevant recommendations based on what the study has found.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

This chapter begins by contextualising the economic development in the African continent, followed by the progress of millennium development goals on the African continent. The following section deals with development theories which include the Neo-Malthusian, Techno-ecology and Modernization theories. The following section discusses the South African economic history, which ranges from the Natives Land Act No. 27 of 1913, to the Native Trust and Land Act of 1936, to the land issues in the apartheid period (1948-1993), and also to the land issues in the post-apartheid regime (1994).

Food security issues can also be explained by different theoretical approaches, such as the entitlement approach, the basic needs approach, the income-based approach, and the sustainable livelihood approach. Moreover, the conceptual framework is used to explain the concepts of rural poverty and food insecurity that prevail in most rural societies in the world.

2.2 Economic development in African continent

The economic development of a country is a complex process which includes the institutional and structural changes in the economy as well as in society (Ngowi, 2009; Eastin & Prakash, 2013). It encompasses improvements in human well-being (Dasgupta, 1993; Edewor, 2014) whose development is determined by various factors, such as political and social integration, social capabilities, geography, institutions, and inequality (Landes, 1998; Khan, 2000; Viterna & Robertson, 2015). According to Ashaver (2013), economic underdevelopment refers to the condition where a certain portion of the population lives in an unacceptable state of or in absolute poverty.

In the past decade, the African continent has experienced high and persistent economic growth, which led some analysts to posit that the continent has reached its peak in terms of development (EDAR, 2014). Despite Africa's high and continuous economic growth in the past decade, most countries within the continent faced several developmental challenges, such as high unemployment, food insecurity, poverty and inequality, environmental damage, and a lack of economic transformation (ES, 2015).

In addition, the African continent has experienced challenges of extreme poverty, hunger, high unemployment and inequality (ECA & UNC, 2013). Moreover, at the millennium summit, the world leaders committed themselves to attain economic development by achieving eight millennium development goals by 2015 (Obeng-Odoom, 2013).

2.3 The progress of millennium development goals in Africa

The sustainable development goals came after the millennium development goals. Hence, the current study reports about the progress of the millennium development goals within the African context with specific reference to the Sub-Saharan region. Altman *et al.* (2009) asserts that South Africa, as part of the aforementioned region is regarded as food secure at the national level, but the rural poor households experience food insecurity. The failure to attain the millennium development goals in Africa will result in low economic development within the continent, especially in Sub-Saharan African countries (Omideyi, 2007).

In 2000, the world leaders agreed to committ to ensure that they attain the economic development by achieving eight millennium development goals. These goals include: the eradication of extreme poverty and hunger; the attainment of universal primary education, the promotion of gender equality and empowerment of women; the reduction of child mortality, the improvement of maternal health; the combating of HIV and AIDS, malaria and other diseases, the ensuring of the provision of environmental sustainability and; the formation of a global partnership for development.

2.3.1 Eradication of extreme poverty and hunger

Sub-Saharan Africa has 48 countries and it is the only region in the globe where the number of people living in extreme poverty continues to grow (Mondal, 2009). This was also confirmed by Stats SA (2013) which revealed that the number of people living in extreme poverty rose from 290 to 414 million in 2010. According to the United Nations (UN) IN 2012 about 80% of the people in the Sub-Saharan Africa and South Asia live in extreme poverty and the progress towards the attainment of the millennium development goals has been very limited.

Poverty projections reveal that the goal of poverty eradication seems impossible to accomplish in Sub-Saharan Africa, because the progress towards achieving this goal is minimal. Unless the performance of economic development can be improved in the near future to ensure the attainment of this goal, the number of poor people will increase considerably (Pingali *et al*., 2006).

2.3.2 Attainment of universal primary education

In the last three decades, the Sub-Saharan Africa region has made extremely slow progress towards achieving the goal of universal primary education (Nishimura *et al.,* 2008). In addition, even though progress has been made, none of the countries within the region have reached 100% as their target (Hailombe, 2011). According to Ngugi *et al.* (2015), the primary enrolment has increased, while the drop-out ratio declined. Between 1999 and 2007, the average primary enrolment rose from 56% to 73% (UN, 2010).

Asankha and Takashi (2011) revealed that the enrolment of school children has been reduced by 13 million from 1999 to 2007. According to Muro and Muchi (2007), agricultural education positively affects food security status through improved production methods, particularly in the rural areas, since it increases the agricultural output. FAO (2010) stated that insufficient of education results in low production, decreases the chances for employment which exerts an influence on the earning capacity and consequently gives rise to an increase in the level of poverty and hunger.

2.3.3 Promotion of gender equality and empowerment of women

Promoting gender equality and women empowerment is considered another effective way of fighting against poverty, hunger and diseases and enhance the sustainable economic development (Ogato, 2013). According to Rasugu (2014) even though the world investment devoted to gender equality and women empowerment has grown more effort is needed to achieve this Millennium Development Goal, particularly in Sub-Saharan African countries. According to Ivers and Cullen (2011) in developing countries women produce about 80% of the food. Thus, the financial support to enhance food production in this group could increase the food availability and eventually advance their food security status.

2.3.4 Reduction of child mortality

In the year 1990, the global incidence of child mortality was 12.7 million, which declined to 6.3 million in the year 2013 and this reflects a reduction of about 17 000 child deaths each day (Beattie *et al.,* 2015). According to UNICEF (2010), even though the number of children who die each day has declined considerably, it is still far below two-thirds as required target. In addition, approximately half of the global child mortality in 2012 (of children under five years old) took place in Sub-Saharan African countries and constituted approximately 3.2 million deaths. Black *et al.* (2008) reported malnutrition as one of the primary leading causes of child mortality in most developing countries.

2.3.5 Improvement of maternal health

The Sub-Saharan African region has a high prevalence of maternal deaths; one of the causes of which is the lack of obstetric facilities for a healthy delivery (Burton, 2013). It was also observed that, each year, 830 women in the world die in pregnancy and childbirth and 99% of these occurred in developing countries, where an estimated 85%of the population live. Hence, more than 50% of maternal deaths occur in Sub-Saharan Africa (WHO, 2014).

According to Nieburg (2012) in both Sub-Saharan Africa and South Asian the maternal mortality rate constitutes about 85%. The same researcher maintains that, in the previous 25 years, some countries including countries that are regarded as resource poor have successfully reduced the number of maternal deaths, however, many countries are still far behind in achieving this goal.

2.3.6 Combating HIV and AIDS, malaria and other diseases

In Sub-Saharan Africa, the number of people who live with HIV and AIDS is approximated at more than 25 million, which negatively affects economic development in Southern and Eastern parts of the continent. This trend seems to increasingly affect other regions within the continent (Sandkjaet, 2009; Kabajulizi and Ncube, 2015). The prevalence of HIV and AIDS in Sub-Saharan African countries constitutes more than two-thirds of the global burden, followed by Asia and the Pacific, approximately 372 000 people became infected with HIV and AIDS in the year 2011 (Bhutta *et al.,* 2014).

Despite the improvements in the health system and resources devoted to reduce the spread of HIV and AIDS around the world, particularly in developing countries, the mortality level caused by this pandemic remains high. This exacerbates the prevalence of food insecurity in regions where more than ‘‘800 million people remain chronically undernourished and the HIV epidemic largely overlaps with populations already suffering from low diet quality and quantity’’ (Ivers *et al.,* 2009). This indicates that a diversified diet has a significant contribution towards human well-being and also extends human lives.

2.3.7 Ensuring the provision of environmental sustainability

All over the world, East Asia is the only region that has managed to attain the goal of environmental sustainability, while six other regions failed to make progress towards achieving this goal. In addition, the Sub-Saharan African region is regarded as unsuccessful in achieving any millennium development goal (Munoz, 2008). In contrast, the United Nation (UN) in 2014 report revealed that the African continent has made good progress in achieving the Millennium Development Goal of environmental sustainability and most African countries have reduced their emissions of ozone-depleting substances.

Richardson (2010) reported that in most developing countries the food security status depends on the conservation of natural resources. Thus, a decrease in pollution and soil degradation could result in an increase in food production which positively affects the food availability as it is one of the food security pillars.

2.3.8 Developing global partnership for development

It is of crucial importance for the world to create a global partnership for development, because richer countries shape their policies and actions around ensuring that they assist the less developed countries in the fight against poverty. Less developed countries particularly those situated in Sub-Saharan African region cannot manage to mobilise sufficient resources and achieve all of the Millennium Development Goals by 2015, unless significant improvements are made in terms of: administration aid, international trade and the creation of an everlasting solution to debt crisis (Mutasa, 2005; UN, 2013).

However, the progress of the Millennium Development Goals is very slow. Mondal (2009) outlined that the number of people living in extreme poverty continues to grow in the African continent, particularly in countries located in the Sub-Saharan Africa region (Stat SA, 2013). Munoz (2008) pointed out that the Sub-Saharan African region is considered to be unsuccessful to achieve the millennium development goal. In the context of the current study, as Altman *et al.* (2009) discovered a direct link between poverty and food insecurity, if the African continent, particularly the Sub-Saharan African region, failed to achieve these millennium development goals, this might exacerbate the level of poverty and food insecurity.

2.4 Development theories

This subsection introduce development theories which include the Neo-Malthusian theory, the Techno-ecology theory and the Modernisation theory. The Neo-Malthusian theory deals with food and population growth, which was introduced for the first time by Robert Malthus in his 1798 essay. On the other hand, the Techno-ecology theory examines the limitations imposed by population growth on natural resources (e.g. land). Techno-ecology theorists argue that an increase in population also results in an increase in output per capita and increases the number of new inventors. The last important theory that underpins food security is the modernisation theory, which was introduced by western countries in an attempt to transform the traditional societies to modernised communities by introducing new technological advancements and social morals (Chaundhary, 2013).

2.4.1 The neo-Malthusian theory

According to Paarlberg and Paarlberg (2013), Robert Malthus predicted in 1798 the association between population growth and food production in 1798. The same author argued that the population growth pressure could result in lower returns on land (for food production), because the population grows exponentially, while food production increases in an arithmetic rate due to the resource constraints. Thus, the Neo-Malthusian theory is the extension of Malthusian's original work, based on the fact that both of these theories apply the very same method.

The Neo-Malthusian theory posits that population growth and high fertility rate cause over-cultivation, which results in deforestation, excess fertiliser use, and environmental damage, and these consequently challenge the food security (Cohen, 1995; Sherbinin *et al.,* 2007; Stock, 2013). The detrimental effect of an increase in child dependency has been found to be widespread in rural areas, mainly because of expanding households or family sizes due to higher fertility rate. This forces the rural residents to intensify the use of land, thereby putting the marginal land into production and hence, perpetuating soil degradation which leads to lower agricultural production and, therefore, weakens food security (Jenkins and Scanlan, 2001; Muyanga & Jayne, 2014).

Scanlan (2003) and Hanson (2013) revealed that the only possible way to attain food security the society needs to avoid environmental degradation in order to meet the needs of the current population without sacrificing the needs of the upcoming generations. Scanlan (2003) further argues that the agricultural policies such as the ‘land use strategy' have to be in place in ensuring that the soil fertility and natural resources are conserved, while adequate output is produced for markets and consumption. Thus, this study focuses on family size as one of the variables of interests. It is also critical to examine the family size and to investigate whether those families that have many family members are food insecure or not, compared to those families that have fewer members.

2.4.2 Techno-ecology theory

Some economists use a technological optimistic view which contends that an increase in population means an increase in per capita production (Smith, 1979 in Nafziger, 2012). According to Smith (1979) as cited by Nafziger (2012) when the population increases, the number of inventors also increases and this subsequently leads to an increase in the supply and demand of new inventors. Hence, production and economic growth also rise.

The application of science and technology as well as the vibrant political and economic policies results in improved food production and distribution system which also results in an improvement in food security (Cohen, 1995; Dobermann & Nelson, 2013). Sherbinin *et al.* (2007) argued that an increase in population has to be treated as an asset rather than

considered as a threat to food production, because when the population grows it means that the communities would have more solutions to their problems.

Techno-ecologists argue that technological innovation and human intelligence cannot be constrained by the scarcity of natural resources; rather they will overcome those constraints of lower returns on land caused by population pressures (Scanlan, 2003; Jonsson, 2014). Improved agricultural output and food distribution methods through transportation channels would offset the problems that have been caused by population pressures. Thus, food availability rises and also leads to an increase in food access (Scanlan, 2001).

Moreover, the techno-ecology theory is of huge importance to the current study, because it includes improved agricultural output, food availability and food accessibility. In this study, both food security pillars (namely, food availability and food accessibility) are critically examined to trace their impact on food security among the rural indigent households in the Mbizana local municipality.

2.4.3 Modernisation theory

The modernisation theory was developed by the western countries in the 17th century with the intention of introducing new technological advancement and social morals. It is multi-dimensional in nature and evaluates the country's progress and the specific variables which directly affect the nation's progress (Chaudhary, 2013). Modernisation has been considered the evolutionary change in traditional to modern societies. A population’s illiteracy, lack of infrastructure, communication, traditional agrarian and low division of labour are considered to the measures of underdevelopment of that population (Kuhnen, 1986).

According to Scanlan (2003) modernised societies are perceived as well educated, politically stable, industrialised, wealthy, and the best-fed communities. The same author further argued that economic growth positively contributes to the nation's capability to feed itself and therefore, when a particular country manages to achieve modernisation, it can also attain food security. Modernisation theorists argue that educational growth and domestic investment result in industrialisation and consequently lead to higher economic growth and social welfare (Jenkins & Scalan, 2001; Pillay, 2011).

In rural areas, education results in an improvement in agricultural output which eventually improves the households' food security (De Muro & Burchi, 2007). Globally, the vast majority of poor people reside in rural communities and rely on agricultural activities as the backbone of their livelihood. They also focus on factors that enhance the small-scale agricultural productivity which comes with everlasting solution to resolve the problem of rural poverty and food insecurity (Lopez, 2002).

2.5 South African economic history

South Africa's land issues began from the first arrival of white settlers in the Cape in 1652 which was led by Jan Van Riebeeck. Their intention was to supply fresh meat and vegetables for passing ships and they only occupied a small area of land, but the settlers increasingly acquired more of the land for their project which caused the situation to change (Omer-Cooper, 2000). This caused black South Africans to lose their land because of confrontations with the European settlers (Malebe, 1997) and this reduced the land availability for rural poor people (Tsawu, 2006).

2.5.1 The natives land Act no. 27 of 1913

Prior to the implementation of the Natives Land Act of 1913, and before black South Africans were subjected to the loss of ownership of their land; very few black South Africans suffered from poverty (Modise and Mtshiselwa, 2013). However, due to the close association between poverty and food security, the implementation of the 1913 Natives Land Act and the ensuing land dispossession exacerbated the dismal linkage between food insecurity and poverty.

This Act created a segregation between black South African farmers and white commercial farmers, based on the fact that the white farmers were given massive financial support by the government, since they were given more land, credits and inputs (Helliker, 2013). The Natives Land Act of 1913 confined all black South African farmers to only 7.5% of the country's farmland, while the white minority were given 92.5% (Humann & Tuinder, 2012). The implementation of the above-mentioned Act also exacerbated a discrimination in land allocation (Frantz, 2010).

The aforementioned Act was introduced as a stumbling block which restricted black African peasants from competing with white farmers (Dlamini, 2010). The same author asserts that black Africans were not allowed to live in urban areas unless they worked on white-owned farms.

Dodson (2013) posits that even before the said Act came into effect, some white farmers already started to give Africans, who rented land from them, a choice which was imposed by the Act to choose whether they would forfeit their cattle and crop farming in order to become co-farmers with white farm labourers.

The implementation of the Natives' Land Act of 1913 created rural poverty which was driven by the conflict, taxes and land dispossession, formalised by the Natives' Land Act which caused landless labourers who migrated to urban areas (Gibson, 2012). Altman *et al.* (2009) outlined that poverty and food insecurity are linked and therefore, to achieve the objective of high food security; the first thing that needs to be done is to eradicate poverty.

2.5.2 Native Trust and Land Act of 1936

In 1936, the Natives Trust and Land Act was passed as a continuation of the previous Act which was implemented in 1913 to segregate the territories where whites were located (in urban areas) while blacks were given rural areas as their reserves (Lephakga, 2013). This Act was implemented with the intention of increasing the Natives land from 7% to 13% of the country's land (Murray & Williams, 1994). The rest of the remaining land was reserved for white people (Claassens & Boyle, 2015).

About 80% of the African population was limited to only 13% of the country's land, while the white minority (which constituted less than 20%) owned more than 80% of South African land (Rugege, 2004). The same researcher claims that black Africans were not allowed to purchase or lease the land outside of the reserves. The Natives' Trust and Land Act of 1936 further accelerated the segregation in terms of land allocation and the additional land that was released by the trust was very little for the natives in the reserves (Legae, 1997).

This Act denied black Africans the right to own land and prohibited the blacks to live outside the designated areas without permission from relevant authorities (Klopper & Pienaar,

2014). The implementation of the above-mentioned Act resulted in farm workers who perpetuated the rural poverty, income and residential insecurity (Atkinson, 2007). Moreover, due to the direct link between poverty and food insecurity, as discovered by Altman *et al.* (2009), the passing of the 1936 Act could be one of the contributing factors to high food insecurity that emerged in most South African rural areas and negatively affected the current rural indigent households.

2.5.3 Land issues in the apartheid period (1948-1993)

In the apartheid regime, black South Africans were given only 13% of the country's land in designated areas (known as native reserves) and the remaining land was reserved for white commercial farmers (Goebel, 2005 as cited in Zhanda, 2014). Abel (2015), asserts that the vast majority of the South African population was sent to native reserves, of which the areas were characterised by economically deprived and overcrowded communities.

Kgatla (2013) attests that one of the most painful experiences in South African history was forced removals, where black South Africans were forcibly removed from areas of their birth and dumped in unfamiliar areas. According to Christopher (2001), about 3.5 million South Africans were forcibly removed from 1960 to 1980. Weidman (2004) reveals that, in 1991, about 80% of the South African population were deprived of the right to own land or lease it within the country.

In 1994, the apartheid regime ended and approximately 86% of the country's land was in the hands of white people (who constituted less than 13% of the country's population) whereas black South Africans (who constituted about 85% of the country's population) owned only 13% of the South African land (Kariuki, 2007). Modise and Mtshiselwa (2013) claim that poverty arose from apartheid policies that were implemented by the government in the apartheid regime with the intention of expropriating land from impoverished black Africans.

The policies that were enacted by the apartheid government serve as one of the contributing factors to poverty and high inequality in South Africa, mainly because the majority of black South Africans have remained landless (Bailey, 2007). Liebenberg (2000) regards poverty

and inequality as the legacy of apartheid. This led the ANC government to implement the land reform programme in order to redress the adverse impact of the apartheid policies to reduce the poverty and food insecurity among the rural poor households (RDP, 1994; Twala, 2012).

2.5.4 Land issues in post-apartheid period (1994)

It is well documented that black South Africans were forcibly removed from their land without any compensation and forced by the situation to resort to underpaying farm employment (Mbeki, 1964 as cited in Lepheane, 2007; Kgatla, 2013). The huge inequality in land allocation under the apartheid regime served as one of the major sources of poverty within the country, particularly for black people (Modise & Mtshiselwa, 2013). The same authors further attest that black Africans who were poor under the apartheid system continued to be poor even in the post-apartheid regime.

One of the reasons for these black Africans to be poor after the apartheid regime is due to the loss of their assets, which were taken away from them during the colonial and apartheid regime (Hall, 2014). The legacy of the apartheid policies resulted in huge inequality in terms of wealth and land allocation. This required immediate post-apartheid policies, such as: land reform programmes to create fair and equitable land distribution and secure people's rights to land access as well as other resources (LRPDD, 2012). According to Dlamini (2008) about 84% of the South African land is still in the hands of white people and it is of crucial importance for the government to implement the land policies that aimed to reverse the negative consequences of historically and racially based inequalities.

Rungasamy (2011) reveals that the South African land reform was necessitated by inequitable land distribution which first started from colonisation and was later on exacerbated by the apartheid government. According to Van Niekerk (2005) the South African land reform programme was designed as a result of apartheid policies that were implemented to dispossess the land from black Africans, forced removals and racially inequitable land distribution. Mokgupi (2015) is of the opinion that the land reform programme was implemented as an attempt to redress the legacy of the apartheid regime.

Land reform is the programme aimed at increasing the land access through the process of giving poor people the rights to land ownership and it also ensures sustainable land use (Binswanger & Elgin, 1992). The ANC-led government proposed the land reform programme in order to abolish all kinds of racial restrictions on land ownership and also proposed the affirmative action programme with a specific reference to assist those people who lost their land or those who were forcibly removed from their land, to acquire land (Coles, 1993).

According to Mafora (2014), the land reform programme is regarded as one of the programmes that could address the past inequalities and also reduce the poverty in the historically disadvantaged communities. The vast literature that has been discussed to eradicate poverty indicates that there is an increase in the body of literature which recommends improvements in land access for the rural poor (Carter, 2003; Deininger, 2003; de Janvry *et al.,* 2001, as cited in Muchapondwa, 2016). The aforementioned programme plays a significant role in South Africa, because it increases the efficiency, economic growth and also reduces the poverty rate (Deininger *et al.,* 2009).

In contrast, Kepe and Tessaro (2012) maintain that the land reform programme did not produce the favourable outcomes that were expected as less than 10% of the country's land had been distributed since 1994 (Kloppers & Pienaar, 2014) and the small ef

fort that has been devoted towards the land reform programme did not yield the improvements in the livelihood of the beneficiaries (Kleinbooi, 2011). Dlamini (2013) outlines that the land reform programme has three main pillars which include land redistribution, restitution and a land tenure system.

Buthelezi (2008) reveals that the main aim of the land redistribution programme is to provide the poor and the previously disadvantaged groups with access to land for production and residential purposes. According to the DLA (1997) the white paper on South African land policy showed that the approach towards land policy implementation was not based on land expropriation but it was based on the willing buyer-willing seller principle, where the land

has to be acquired through market purchases from landowners who agreed to sell their land at a prevailing market price.

Lemke and Jansen van Rensburg (2014) indicate that the land restitution programme intends to restore the land or attempt compensation in the form of cash payments to those people who lost their land from 19 June 1913. Koopman (2014) affirms that land reform programmes, restitution and land redistribution are of crucial importance in South Africa. The same researcher further asserted that the land was illegally taken away from the South African indigenous people and, therefore, the land has to be reclaimed and redistributed. The land tenure system is considered the most complex pillar of the land reform programme, specifically in rural areas (Lethobeng, 2011).

The land restitution programme aims to ensure the legally validated land holdings and this tenure security was drafted under section 25(6) in the South African constitution (Dhliwayo, 2012). Bonti-Ankomah (2001) outlines that the Integrated Nutrition Strategy regards land, among other things, as the most important factor towards food security attainment, because if households do not have access to land they cannot produce food on their own, which causes households to be food insecure. Mudefi (2011) claims that the land reform programme was implemented to ensure the equitable distribution of the arable land, improve agricultural production and enhance household food security.

Jacobs and Hart (2014) reveal that the department of rural development and land reform programme engaged in a programme that could improve the social and economic status of the rural communities with specific emphasis to reduce unemployment, poverty and food insecurity. According to Weidman (2004), the land reform programme resulted in an increase in agricultural output and the economic growth generated by the agricultural sector which played a pivotal role in achieving food security. The same author attested that the agricultural economic growth increased the aggregate food supply, created more employment opportunities in rural communities and increased rural wages which enabled people to buy food or invest in other activities that would generate more income, such as productive assets and education.

However, this study will focus on a land restitution programme, because it involves cash payments as compensation as it happened in some of the rural areas in the Mbizana area. Therefore, this study seeks to investigate the implication of that compensation towards the food security status among the rural indigent households in the Mbizana community.

2.6 Sustainable livelihood approach

Amartya Sen in 1981 introduced the livelihood approach (Moreda, 2012) which was further developed by various researchers in the 1980s and 1990s (Chambers, 1983; Chambers and Conway, 1992; Bernstein *et al.,* 1992; Carney, 1998; Scoones, 1998; Bebbington, 1999; Ellis, 2000). Most discussions on sustainable livelihood focus on rural areas based on the fact that households in these areas are involved in farming and produce part of their food for survival purposes (Krantz, 2001). The sustainable rural livelihood approach refers to the way of thinking about the priorities, and objectives for development in ensuring progress in poverty eradication (DFID, 1999).

Livelihood can be considered as sustainable when households cope and recover from stress and shock, and when they manage to maintain their capabilities and assets whilst not compromising the natural resources for the future generations (Goldman *et al.,* 2000). Households apply various ways in order to gain the sustainable livelihood security, such as land and livestock ownership, secured employment with sufficient amount of remuneration and other relevant activities (Chambers & Conway 1992).

All over the world rural poor households use various forms of livelihood strategies in order for them to survive and hence, those with little means to maintain their living are characterised as threatened by livelihood uncertainty and are also considered food insecurity (Purvis & Smith, 2006; Smith, 2012).

2.6.1 Rural livelihood strategies and food security

According to Meyer *et al.* (2009), the agricultural sector is characterised as the backbone of the Africa's economy. The same author posited that about 80% of poor households in Africa live in rural areas and rely on agricultural activities in order to maintain their livelihood. Agricultural sectors improve household food security in different ways; most importantly it

increases the amount of food and also provides rural households with a means to purchase more food. Improved agricultural productivity and income generated from the sale of produce allows the rural poor households to purchase more and diversified food (Nchuchuwe & Adejuwon, 2012).

In addition, even though the agricultural sector makes little contribution to the South African gross domestic product, it plays a most significant role in enhancing the food security in rural-based communities (D'haese *et al.*, 2013). In this study, a rural livelihood strategy (such as farming) will be examined to trace whether or not the rural poor households who engage in farming are more food-secure compared to those who do not involve themselves in farming.

2.6.2 Rural livelihood diversification and food security

Muruviwa (2011) outlined that, even though agriculture has been used by most rural people as the major livelihood strategy, development theorists revealed that it is not the only method to be used for survival purposes. Ellis (2000) posits that rural livelihood diversification is the process in which rural households engage in diversified portfolios and social support capabilities to earn a living and thus improve their living standards.

Livelihood diversification is of crucial importance in rural-based communities, mainly because it enables rural households to be involved in both farming and non-farming activities which are perceived to generate more income (Hussein & Nelson, 1998). It is expected that the income generated from livelihood diversification strategies translates into adequate food access, which consequently results in food security attainment for rural indigent households (Mensah, 2014).

2.7 Basic needs approach

The basic needs approach originated in 1917 from Rawls' Theory of Justice which focused on a bundle of primary goods for well-being (Streeten *et al.*, *1981*, as cited in Santos *et al.*, 2010) which is also considered essential to enable people to live a good life. The basic needs approach is based on meeting the basic needs of the poor people within the shortest period of time (Ghai, 1977, as cited in Zithutha, 2010). The major objective of basic needs

is to eradicate poverty and enhance the development of underprivileged communities (Moller & Amons, 1985; Mbuli, 2008; Kumari, 2013).

The advocates of the basic needs approach considered development as the process that targets to ensure that everyone achieves the maximum satisfaction of their basic needs (Burch & De Muro, 2012). According to Tollman (1984) basic needs include: sufficient food, shelter and clothing, access to drinkable water and sanitation, health and education.

2.8 Entitlement approach

At the beginning of the 1980s, Amartya Sen introduced the entitlement approach which challenged the Malthusians' thought of famine and hunger and also changed the focus from national food availability to people's access to food (Burchi & De Muro, 2016). The entitlement approach concentrated on people's ability to command food, based on legal (acceptable) means that were considerable within the community, including the possibility of production, trade opportunities and other acceptable means of acquiring food (Sen, 1981).

Moreover, Sen considered food ownership as being one of the most primitive property rights and further noted that in each community there are rules that govern this right (Sarracino, 2010). Dreze and Sen (1989) view hunger as the entitlement failure. The entitlement depends on resources (tangible and intangible assets) that an individual legally owns, such as a house, livestock and land ownership (Osmani, 1995 as cited in Burchi & De Muro, 2012).

Women in particular are the most common victims of poverty and food insecurity in most rural areas, based on the fact that they are still oppressed by cultures and religions which force them to disown any kind of resources; like access to productive assets such as land and livestock ownership. As a result, women experience a poverty trap and persistent food insecurity (Njuki & Sanginga, 2013).

2.9 Income based approach

The income-based approach is completely different from other approaches such as the food availability approach, which concentrates on the volume of food available at national level. This approach concentrates on minimum income required to purchase a sufficient amount of food (Burchi & De Muro, 2012). The income-based approach is the same as the traditional method used to examine poverty (Burchi & Muro, 2016). Poverty is defined as the lack of income or a consumption of a particular household which falls below a pre-determined threshold in order to meet the basic needs (Bhuiya *et al.*, 2007).

The World Bank set a threshold of $1 per day as a global poverty line, which indicates that those who spend less than $1 per day are in absolute poverty, while those who spend $1 and more per day are non-poor (Muruviwa, 2011). Most rural households suffer from severe poverty and food insecurity based on the fact that they used to experiencing a huge shortfall in their income, which consequently traps them in persistent poverty and food insecurity. In addition, rural poverty and food insecurity are exacerbated by low incomes received by rural households (Masuku, 2013). The income approach will be critically examined in this study to investigate whether those rural poor households who have little incomes experience food insecurity or not.

2.10 Conceptual framework

The conceptual framework deals with issues which underpin the rural poverty and food insecurity. This section begins by discussing the food security dimension which includes four pillars, namely: food availability, accessibility, utilisation and food sustainability. They are followed by food security in a global context, food security in Sub-Saharan Africa, food security in South Africa, food security measures and poverty in South Africa.

2.10.1 Food availability

According to Khan and Gill (2009) food availability is achieved when all households at all times have a sufficient amount of food. Hence, the households who fail to acquire the adequate food are classified as food insecure (Mashamaite, 2014). Some of the rural

households experience the prevalence of hunger and food insecurity due to the fact that they fail to produce the sufficient amount of food (Omotesho *et al.*, 2010).

In contrast, Duskin (1995) opposed self-production and argues that food availability can be achieved when three major aspects are taken into consideration, these being: food imports, subsistence and national food production. Moreover, food availability and food access are closely linked. Food availability alone cannot be considered the pathway to attaining food security (Ojo & Adebayo, 2012). However, this study used the household food insecurity access scale (HFIAS) specifically to examine the food access as well as availability among the rural indigent households in the Isikelo area.

2.10.2 Food accessibility

Food accessibility depends on households' ability to obtain food, either from food production, purchases or food transfers (Maponya, 2008). Runge *et al.*, (2003) point out that households' lack access to food due to inadequate income and political disadvantages. These authors further argue that even if food is available in the market, when households do not afford to purchase those food items they are food insecure. High food prices result in a decline in consumers' food choices which consequently reduce the frequency of food being purchased (Prakash, 2015).

The escalation of food prices is caused by the fact that rural consumers' access to markets is restricted by distances to supermarkets, lack of transport and insufficient infrastructure (Coveney & O'Dwyer, 2009). In addition, most of the rural indigent households rely on purchased food mainly because they do not have land to produce their food which makes them vulnerable to high food prices (Sahn *et al.*, 1997; Philander, 2015). This makes households to be unable to access food which negatively affects their livelihood (Maponya, 2008).

Moreover, this study also focuses on food access in order to investigate whether or not the self-production plays a significant role in reducing food insecurity among the indigent rural households in the Mbizana area.

2.10.3 Food utilisation

Food utilisation refers to how an individual or a household absorbs the sufficient nutrients and the quality of food intake (Jones *et al.*, 2013). Kakwani and Son (2015) define food utilisation as the actual food consumption of the adequate quantity and quality which provides sufficient nutrients as well as adequate energy to household members. Household members who have imbalances in their diet due to insufficient access to food of the highest quality for a balanced diet, are food insecure (Madziakapita, 2009). According to Black (2003) food provides various nutrients and proteins that enable the human body to function well. The same author further outlined that the insufficient intake of these nutrients results in illnesses which causes death through infectious diseases.

2.10.4 Food stability

Food stability refers to the continuity of the food supply. One of the factors that affects food stability is the seasonal variations in food supply (Ziervogel & Frayne, 2011) caused by changes in climate, political instability, price fluctuations and economic factors (Ziervogel & Ericksen, 2010). Changes in climate include droughts, floods, cyclones and hailstorms (IPCC, 2007). These lead to greater fluctuations in local food supplies due to large variations in crop yields (caused by higher risks of landslides and erosion damage) which negatively affects the stability of food supplies as well as food security (Schmidhuber & Tubiello, 2007).

2.11 Food security in a global context

The United Nations Food and Agriculture Organisation (FAO) have a duty to estimate the total number of people who are chronically undernourished in the world (Paarlberg & Paarlberg, 2013). The FAO (2002; 2015) argues that, at the 1996 World Food Conference, world leaders from different countries committed themselves to halve the number of undernourished people in developing countries by the year 2015. However, the number of undernourished people remains unacceptably high (FAO, 2010).

The total number of undernourished people was estimated at 925 million in the region and of this, 906 million people live in developing countries (FAO, 2010; Bashir& Schilizzi, 2013). The undernourishment by region in 2010 reveals that there were 578 million hungry people

in Asia and the Pacific, followed by 239 million people in Sub-Saharan Africa, 53 million people in Latin America and the Caribbean, 37 million people in North Africa, and 19 million people in developed countries (Sasson, 2012). Moreover, Ndobo (2013) pointed out that food insecurity is a problem that affects the entire world.

Philander (2015) mentioned that most people in the world go to sleep without food every night. The same author further argues that the issue of hunger is unacceptable, immoral and unethical. One of the fundamental issues faced by the world today is how to ensure that millions of households who live in poverty gain access to sufficient food (Adekunle, 2013). Grobler (2013) defines food security as the condition achieved when all households at all times have economic and physical access to adequate, safe and nutritious food in order to maintain a productive and healthy lifestyle.

In 2007, high food prices dragged millions of people into food insecurity and worsened the condition of those who were already food insecure, which eventually undermined the long-term global food security (FAO, 2008). Poor households who were net buyers of food were negatively affected by high food prices, because they spent large proportions of their incomes on food and that led to low dietary diversity, low-quality food and a decrease of adequate food intake (Earl, 2011).

Both urban and rural poor households were vulnerable to high food prices (Von Braun *et al.*, 2008; Hadley *et al.*, 2011) which made things more difficult for them (Gustafson, 2013). According to WHO (2003) poor people may not have at sufficient quantity of food and cannot afford the variety of diets.

2.12 Food security in Sub-Saharan Africa

The African continent has low food production and its population increases at a rate of 3%annually, which contributes to high food insecurity within the continent (Tembwe, 2010). The same author also asserts that in Sub-Saharan Africa the number of people who are suffering from poverty has risen from 184 billion in 1985 to 216 billion in 1990. Sub-Saharan Africa has managed to make progress towards halving the number of people suffering from hunger (FAO, 2015).

The FAO (2015) further reveals that even though the number of people suffering from hunger has been reduced in Sub-Saharan Africa, they are still confronted by a rising population, which undermines the supply as well as the access to food. Zuberi and Thomas (2012) contend that an increase in the population of the above-mentioned region leads to environmental degradation.

FAO (2013) revealed that an increase in livestock production and higher crop yields played a significant role in reducing the number of undernourished people in Sub-Saharan Africa. According to FAO (2011) the agricultural sector played a vital role towards African development and it was also regarded as a key fundamental contributor to economic growth, increased income, upliftment in the standard of living, eradication of poverty and enhancement of food security. A decline in international and domestic food prices, and satisfactory economic recovery after 2008 also resulted in a reduction in a number of undernourished people.

But despite this progress, about 200 million of the Sub-Sahara's population are still suffering from chronic hunger (Kidane *et al.*, 2005). On the other hand, Sub-Saharan Africa is considered to be the region that holds the second highest burden of people who are suffering from hunger, with 239 million food insecure people, following South Asia with 578 food insecure people (Fanzo, 2012). According to Heinemann *et al.* (2011), Sub-Saharan Africa has the highest prevalence of rural poverty and this region is negatively affected by poverty and hunger.

2.13 Food security in South Africa

In 1994, the South African government took the initiative to implement the reconstruction and development programme (RDP) as the strategic framework to ensure the food security attainment and prioritise food as a human basic need (IFSS, 2002). The prevalence of food insecurity causes concern in most households in South Africa, mainly because this pressing concern is connected to high poverty levels that take place in the country, specifically in rural based communities (Abdu-Raheem, 2011). Altman *et al.*, (2009) emphasised that South Africa is indeed food secure at a national level, but households who reside in rural areas experienced severe food insecurity. Poverty and food insecurity in South Africa were

further accelerated by the colonial and apartheid policies that were implemented with the intention of suppressing the well-being of the black majority, particularly in the homelands (IFSS, 2002).

In addition, poverty and food insecurity denote ‘the legacy of the apartheid socio-economic and political order' (Spark, 2007). Koch (2011) posits that South Africa's inability to meet the basic needs depends on various factors, but in most countries, poverty and hunger signify the legacy of apartheid. The same author stated that one of the systems under the apartheid regime was the dispossession of assets such as land and livestock from a black majority and the denial of their access to markets, infrastructure and human capital.

The colonial and apartheid government in the 19th and 20th centuries forcibly removed black people from their land which negatively affected their ability to proceed with their farming and entrepreneurial activities. This led black people to migrate and work mainly in mines and on large farms because they were unable to produce the sufficient food for themselves which increased poverty and food insecurity (IFSS, 2002; Bikombo, 2014). The South African government implemented the Intergrated Food Security Strategy as one of the post-apartheid policies to address the adverse impact of the policies that were created by the apartheid government (Balarane, 2013).

The motive behind the implementation of the Integrated Food Security Strategy (IFSS) by the South African government was to enhance food security among the rural indigent households as Du Toit *et al.* (2011) reveals that about 75%of the people, which represent the majority of poor households, live in rural areas. The vision of the IFSS is ‘‘to attain universal physical, social and economic access to sufficient, safe and nutritious food by all South Africans at all times to meet their dietary and food preferences for an active and healthy life'' (DoA 2002). This definition is the same as the one that was provided by Food and Agriculture Organization (De Cock *et al.*, 2013).

2.14 Food security measures

Household Food Insecurity Access Scale (HFIAS) was developed by USAID in 2007 and it is commonly used by various researchers as a tool to differentiate food secure from food

insecure households (Coates *et al.*, 2007). This HFIAS has two categories: the first one entails occurrence questions and the second category has the frequency of occurrence questions. The minimum score is zero and the maximum is 27. If a particular household does not experience any kind of food insecurity conditions, they do not have to worry about not having sufficient food each month, then that particular household is considered to be food secure.

But a household that experiences food insecurity such as going the whole day or night without eating is considered as food insecure (Coates *et al.*, 2007). Another measure or a proxy of food security is known as Dietary Diversity Scores (DDS) which refers to the amount of food consumed by households in a given time period. Usually, it is to be a 24-hour recall, whereby households are asked about the number of food items they ate a day before the survey (Taruving *et al.*, 2013).

The third proxy for food security is known as Food Consumption Scores. A Food Consumption Score (FCS) comprises a frequency weighted dietary diversity score which has food frequency, nutritional importance of the different varieties of food groups, and dietary diversity. When calculating the FCS, the frequency of consuming five different food groups by a household, 7 days before the survey, is undertaken (WFP,2006). The fourth food security proxy is the Coping Strategies Index (CSI), a method that is very easy to use and understand.

This approach also has a close correlation with other food security measures. Households are questioned based on their ability to cope with food shortages and a numeric score is obtained from this. The results from the CSI score showed whether a household food security status was improving or not (Ndobo, 2013). Given various methods of measuring food security, this study used the food insecurity access scale (HFIAS) and the dietary diversity scores to estimate both logit regression models. These measures were selected to achieve the objectives of the study, where the first one were to assess the dietary pattern and also evaluate the factors that influence the food security among the rural indigent households in the chosen study area. Whereas the second objective were to examine the food security using the previous 30 days as a norm.

2.15 Poverty in South Africa

The lack of adequate food, e ducation and shelter and being vulnerable to natural disasters (such as droughts and floods) are considered the consequences of poverty (Namara *et al.*, 2010). According to Sen (1981) poverty arises when individuals or households fail to meet their basic needs. The poverty issues have numerous dimensions which reinforce one another in a very multi-faceted manner (Smith, 2004). Siphambe (2003) outlines that the link between low education levels and income among the poor households exacerbate the level of poverty.

The post-1994 development policies that were implemented by the South Africa government focused on poverty eradication in rural communities and incorporated the rural development programmes in the process in order to build up the economy (LBFP, 2010). The poverty creates most complications, specifically in rural-based communities, because it restricts the peoples' ability to seek employment, and consequently leads to a long-run unemployment trap (Du Toit *et al.*, 2011).

According to Leibbrandt *et al.* (2011), the prevalence of poverty emanated from unequal income and wealth distribution among the population groups. The end of the apartheid regime raised hopes in many South African citizens living in poverty that the democratic government would change the lives of the citizens by taking them out of poverty. But the fundamental issues faced by the South African government include poor planning and failure to address high levels of poverty and hunger in a sustained manner (Phogole, 2010).

The Eastern Cape Province is the second leading province in terms of being food insecure and vulnerable to high poverty rates as it is currently sitting at 70% (Alfred Ndzo IDP, 2014). While the Mbizana local municipality has a poverty rate of approximately 83.60% (MLMSER&O, 2017). Due to the close association between poverty and food insecurity, as discovered by Altman *et al.* (2009), these poverty statistics might be one of the crucial factors that need to be addressed in order to achieve the goal of a high food security among the rural indigent households in the Mbizana area.

2.16 Conclusion

The food security status of the rural indigent households in the Mbizana local municipality can be understood by reviewing various economic theories. This chapter started by contextualising the economic development in the African continent. The economic development has been considered as a complex process which entails the structural changes in the economy. On the other side, underdevelopment has been regarded as an unacceptable condition where people live in absolute poverty. The African continent experienced extreme poverty, hunger, unemployment and high inequality. In the year 2000, world leaders at the millennium summit agreed to commit themselves in attaining economic development by achieving eight millennium development goals.

The literature that has been reviewed indicates that some African countries have made positive progress towards attaining the millennium development goals. But the Sub-Saharan African region is off track on every millennium development goal, which exacerbates poverty rates and food insecurity within the continent. Development theories which include the Neo-Malthusian theory, the Techno-ecology theory and the Modernisation theory have been discussed to underpin the existence of food insecurity among the impoverished rural households in the Mbizana local municipality.

This chapter also reviewed the South African economic history to support and provide reason for the existence of rural poverty and food insecurity, which emanated from colonial and apartheid policies that were enacted intentionally to suppress the black South African majority. These policies include land expropriation as the result of the 1913 Land Act, followed by the Natives Trust and Land Act of 1936 and forced removals later on, around the 1950s. This necessitated the post-apartheid government to implement policies such as a land reform programme in order to redress all kinds of land restrictions in the countries.

Different theoretical approaches, such as: sustainable livelihood, basic needs, entitlement and the Income-based approach have been reviewed as supporting evidence in the existence of food insecurity among the rural indigent households in the Mbizana community. Followed by food security in a global context, food security in Sub-Saharan Africa, food security in South Africa, food security measures (such as the household food insecurity

access scale, the dietary diversity score, the food consumption score, and the coping strategies index), as well as poverty issues in South Africa. All of these conceptual issues serve as the supporting evidence in the existence of food insecurity among the rural indigent households in the Mbizana local municipality.

CHAPTER 3: EMPIRICAL LITERATURE REVIEW

3.1 Introduction

Many studies have been conducted to determine the variables that significantly predict the households' food security status at global, national, regional and local level. In addition, this chapter gives a detailed discussion of the predictor variables that were commonly used by different researchers across the world. Some of them have found other variables insignificant to explain food security, while others found a significant relationship between the dependent and predictor variables.

3.2 Determinants of household food security status

Most of the studies across the world indicated the following covariates to be the main determinants of the household food security status.

3.2.1 Household heads' education level

Ibok *et al.* (2014) examined the determinants of the food security status among the crop-farming households in Nigeria. A logit model was used and it was found that years of formal education have an impact on continuous access to adequate food of the best quality. Hence, the educated household heads were more likely to be food secure than those who did not have formal education. Musemwa *et al.* (2013) also utilised a logit model and found that the education level had an influence on the food security status of the households in the Eastern Cape Province. Moreover, these researchers emphasised that educated household heads were food secure compared to the uneducated category.

A study by Adepoju and Adejare (2013) found that, in Nigeria, the tertiary education of household heads predicted their food security. In addition, the logit model was used and the study acknowledged that the household heads who had tertiary education were more likely to be food secure. Abur (2014) examined food security status among rural farming households in Nigeria. This author emphasised that households that had low education levels were the main victims of food insecurity in the area. In contrast, some researchers found no relationship between the food security and the household heads' education level. Aidoo *et al.* (2013) employed a logit model and found that the education level of household

heads significantly influenced the food security status of the households in Ghana. Kahsay and Milugete (2014) acknowledged that the education level does not influence household food security.

3.2.2 Age of household head

Ndobo and Sekhampu (2013) investigated the determinants of household food security in South African townships. These researchers used a logit model and found that the vulnerability of food insecurity increased as the age of the household head rose in years. De Cock *et al.* (2013) also used a logit model to investigate the food security status in rural areas of Limpopo province in South Africa. The study found that, when the age of the household head increases by a single year, there was an increase in food insecurity.

The study by Mahmood *et al.* (2014) investigated food security determinants among rural household by using a sample size of 120 respondents in Faisalabad, Pakistan. These researchers acknowledged that, as the age of the household head rose by a unit, the probability of being food secure could be detected to increase. Grobler (2013) utilised a logistic regression model and a sample size of 118 households to examine the food security status in low-income households of Bophelong in Gauteng, South Africa. The household food insecurity access scale was adapted to segregate the food secure from the food insecure households. This researcher found that the age of the household head influenced the food security status of the sampled population. Hence, this indicated that, as the age of the household head increased by one year, the food insecurity increased as well.

Kahsay and Mulugete (2014) employed a logistic regression model to examine the determinants of the food security status of rural households in Laelay Maichew Woreda, Ethiopia. The findings of the study revealed that the age of the household head had an influence on the food security status of that household. Moreover, this has shown that elderly people were more likely to be food insecure. In contrast, some researchers did not find there to be a relationship between the age of the household head and food security. These studies include Sekhampu (2013) and Maitra and Rao (2015).

3.2.3 Marital status of the household head

Numerous studies that have been conducted on the determinants of a household's food security status have shown that marital status is strongly associated with household food security (Aidoo *et al.*, 2013; Ndobo and Sekhampu, 2013; Sekhampu, 2013; Grobler, 2013). Kumba (2015) used a descriptive and inferential technique for examining the role of household characteristics in determining food security in Kenya. This researcher indicated that married household heads were more food secure than single household heads.

Adepoju and Adejare (2013) reported a positive, significant relationship between household food insecurity and marital status. In contrast, Kuwenyi *et al.* (2014) found marital status (among other covariates) to be the variable that did not affect the household food security status. Taruvinga *et al.* (2013) investigated the determinants of rural household dietary diversity in the Eastern Cape Province, South Africa. These authors found marital status insignificant predicting the household's dietary diversity, since it is used as a proxy to food security.

3.2.4 Household size

Asogwa and Umeh (2012) used a logistic regression model to examine the determinants of household food insecurity among the rural farming households in Nigeria. The food insecurity line (cost of kilojoules index) was employed in distinguishing households who were food secure from those who were food insecure. These researchers found that, when the household size rose by a single member, the food insecurity increased as well.

The same findings have been reported by Muhoyi *et al.* (2014), who investigated the household food security determinants in Murehwa district, Zimbabwe. These researchers have shown that food insecurity increased as household size rose. Some empirical studies, such as Zakari *et al.* (2014), have shown that among the variables that were included in the logit model the household size was found to be one of the variables which did not influence the household food security status. Kuwenyi *et al.* (2014) also employed a logistic regression model and found that the size of the households was insignificant in predicting the food security of the sampled population in Swaziland.

3.2.5 Dependency ratio

Sultana and Kiani (2011), as well as Adepoju and Adejare (2013), found the dependency ratio to have a positive and significant impact on the household food insecurity status. The above-mentioned researchers outlined that when the dependency ratio increased it leads to an increase in food insecurity. A study by Ahmed and Abah (2014), who used a logit model, found the child dependency ratio to have an influence on the household food security status in Nigeria. Moreover, the aforementioned authors emphasised that an increase in child dependency results in an increase in household food insecurity.

In contrast, some research did not find the association between household dependency ratio and the food security status. Asogwa and Umeh (2012) reported an insignificant relationship between the food security and household dependency ratio. Beyene and Muche (2010) investigated the household food security determinants among the rural households in Central Ethiopia. The study used a logit model and found that the household dependency ratio had no influence on household food security. Gebre (2012) also reported an insignificant relationship between the food security and household dependency ratio.

3.2.6 Remittances

A study conducted by Mango *et al.* (2014) used a linear regression model investigate the household food security determinants among the smallholder farmers in the Mudzi district of Zimbabwe. The study found a positive correlation between food security and household remittances. Iqbal *et al.* (2016) employed an econometric and descriptive analysis for examining the food security and nutrition in Pakistan. These researchers acknowledged that, when remittances increase by a one unit, the probability of the households being food secure increased as well.

Nyikahadzoi *et al.* (2013) studied the social support system for improving food security among the elderly-headed households in communal areas of Zimbabwe. These researchers confirmed that a unit increase in remittances results in a decrease in household food insecurity. In addition, these findings indicated that the household heads who received remittances were less likely to be food insecure.

A study by Abafita and Kim (2013) utilised the ordinary least squares method for examining the household food security of rural residents in Ethiopia. This study reported a negative and statistically insignificant correlation between household food security status and remittances. These authors confirmed that the recipients of remittance were less likely to be food insecure. Agbola (2014) used a Tobit regression model for investing the factors that influence food insecurity among the smallholder farmers in Nigeria. This author reported that remittances were indeed statistically significant and influenced the household food security status in the study area.

3.2.7 Monthly income/total household income

Motbainor *et al.* (2016) investigated the household food security determinants in East and West Gojjam zones of Amhara Region, Ethiopia. These researchers used a logit model and found that monthly income significantly predicted the household food security status in the study area. In addition, the study emphasised that a unit increase in total monthly income in a household lead to an increase in food security. The same findings have been found by Mannaf and Uddin (2012) who examined the socio-economic factors that influenced the household food security status in the Bogra District, Bangladesh.

De Cock *et al.* (2013), Ibok *et al.* (2014), along with Mahmood *et al.* (2014), also found that monthly income significantly influenced the household food security. Sekhampu (2013), Grobler (2013) and Musemwa *et al.* (2013) found the household total income to be one of the variables that influenced the household food security. Tefera and Tefera (2014) used a logit model and found that the total farm income insignificantly affected the household food security in Ethiopia.

3.2.8 Household head employment status

Gebre (2012) revealed that the household head's employment status had a significant impact on predicting the household food security status of the sampled population. In addition, the above-mentioned researcher outlined that the employed household heads were more food secure compared to the unemployed ones. Sekhampu (2013) also noted that the employment status of the head in a household resultedin an increase in the probability of being food secure.

Grobler (2013) reported a significant correlation between the household's food security status and the number of employed persons in that household. This indicated that, as the number of employed persons increased so did the probability of being food secure. It is important to acknowledge that some empirical studies did not find a relationship between the food security and household head employment status. Sultana and Kiani (2011) as well as Kuwenyi *et al.* (2014) reported an insignificant relationship between the employment status of the household head and food security.

3.2.9 Gender of household

Mason *et al.* (2015) used the ordinary least squares technique for examining the determinants of food security in Tanzania. The study found male-headed households to be more food secure than female-headed households. Edeh and Gyimah-Brempong (2015) used a multinomial Probit model to assess the determinants of change and household responses to food insecurity in Nigeria. These researchers found male-headed households more food secure than female counterparts.

Obayelu and Onasanya (2016) confirmed that the gender of the household head indeed affected the household food security status in Nigeria. Abu and Soom (2016) examined the food security determinants in rural and urban farming households of the Benue State in Nigeria. This research found an insignificant relationship between household food security and the gender of the household head of the sampled population.

3.2.10 Agricultural extension services

Hussein and Janekarnkij (2013) studied the food security determinants of rural households residing in the Jigjiga district of Ethiopia. The logit model was used and the extension services were found to have a significant impact on the household food security status in the area. This indicated that the households who had access to extension services were more food secure than those who did not. Tekle and Berhanu (2015) investigated the determinants of the household food security in Ethiopia. The study used a logit model and reported a statistically significant correlation between the household food security status and agricultural extension services. Hence, these authors assert that the extension contracts led to an increase in the food security of the sampled population in the area.

Yusuf *et al.* (2015) confirmed that the extension services had an impact on household food security status. These findings revealed that a unit increase in agricultural extension services increased the probability of being food secure. Matchaya and Chilonda (2012) also acknowledged that an increase in extension services increased the chances of households continuously accessing adequate food of the best quality.

3.2.11 Farm income

Ibok *et al.* (2014) found a positive and statistically significant correlation between household food security and farm income. These findings indicated that the households who received farm income were more food secure than those who did not. Tefera and Tefera (2014) emphasised that the household heads who had farm income were more food secure than those who did not sell any produce from their farms.

Boniphace *et al.* (2015) examined the smallholder farmers' socio-economic determinants for inputs used in Tanzania. The study used a Probit regression model and found farm income to be statistically significant in explaining the household food security status of the sample population. The contradictory findings have been reported in the study that was investigated by Kuwenyi *et al.* (2014) who found that farm income does not influence the household food security status.

3.2.12 Off-farm income

Beyene and Muche (2010) reported a statistically significant impact on household food security status and off-farm income. The findings of the study indicated that the households who diversified their income with other activities had greater chances of being food secure. Mwakanyamale *et al.* (2015) also used a logit model for investigating the contribution of sweet potato to food security status among farming households in Kilosa district, Tanzania. Endale*et al.* (2014) examined the food insecurity in the Northwest of Ethiopia and found off-farm income increases the likelihood in favour of the household food security status.

Ojeleye *et al.* (2014) studied the impact of non-farm income on the food security status of the households who engaged in small-scale farming. The study used a logit regression model and found non-farm income as one of the variables that did not affect the household food security in Nigeria. A study by Asmelash (2014) used a logit model for examining the

determinants of food security of rural households who live in Woreda, Ethiopia. This researcher reported an insignificant relationship between household food security and off-farm income.

3.2.13 Farm size

Obayelu and Onasanya (2016) indicate that an increase in farm size results in an increase in the household food security status. Moreover, the above-mentioned authors posited that an increase in farm size led to an increase in the probability of food security. Mannaf and Uddin (2012) studied socio-economic factors which determine the food security status among the maize growing households in the Bogra district of Bangladesh. The study employed a logit model and found that farm size insignificantly predicting the household food security in the area.

Ahmed *et al.* (2015) also confirmed that the farm size predicts the household food security status. In contrast, Kuwornu *et al.* (2013) investigated the food security status of farming households in the Forest Belt of the central region of Ghana. These researchers used a logit model and found that farm size insignificantly influenced the household food security status in the study area.

3.2.14 Credit access

Grebre (2012) reports a statistically significant impact on household food security status by credit access. Therefore, these findings indicate that the households who have access to credits are more food secure compared to those households who do not have access to credits. Tekle and Berhanu (2015) indicate that the credit access increases the chances for the households to have enough food all the time. Mustapha *et al.* (2016) used an ordered Probit model for investigating the determinants of household food insecurity in Northern Ghana. These researchers discovered a negative relationship between household food security and access to credits. The findings of the study also emphasised that the credit access decreased the households' food insecurity.

Agwu and Irohibe (2014) examine the factors that affect the rural women's access to food security information in Niger Delta, Nigeria. The study employed a Tobit model and found access to credits to insignificantly influence the household food security. Arene and Anyaeji

(2010) studied the household food security determinants in Nsukka Metropolis of Nigeria. These researchers used a logit model and found that access to credits was insignificant in explaining the food security status of the households in the Nsukka Metropolis.

3.2.15 Improved seeds

Abdulla (2015) used an ordered logit model to examine the determinants of household food security status in Bule-Hora district of Ethiopia. The study reported that the improved seeds resulted in an increase in the household food security in the study area. Kahsay and Mulugete (2014) also found improved seeds as one of the variables that influenced the household food security in a positive manner. These findings indicated that utilisation of improved seeds increased among the farming as the improvement in the seeds increased the chances for them to have sufficient food at all times.

Gemechu *et al.* (2016) studied the food security determinants in the HawiGudina district of Ethiopia. The logistic regression model was used and it was found that improved seeds insignificantly affected the household food security status of the sample population. These findings contradict the findings of the other scholars who reported a statistically significant impact on the household food security status by improved seeds. The same findings have been presented in a study that was investigated by Muche and Tadele (2015), who confirmed that improved seeds did not affect the household food security in Jimma Zone, Ethiopia.

3.2.16 Fertiliser application

Beyene and Muche (2010) reported that the chemical fertiliser application affected the households' food security status in a positive way. The findings of this study revealed that as the use of fertiliser increased, so, too, did the probability of food security in the household. Abafita and Kim (2013) also confirmed that the application of increased the household food security status. Hussein and Janekarnkij (2013) emphasised that the use of fertiliser increased the probability of frequent access to sufficient food of the highest quality.

Sichoongwe *et al.* (2014) investigated the determinants and extent of crop diversification among smallholder farmers in the Southern Province of Zambia. The study used a double-hurdle model and found fertiliser use increased the chances of households having enough

food at all times. Nata *et al.* (2014) examined the household adoption of soil-improving practices and food insecurity in Ghana. These researchers indicated that the fertiliser application increased the likelihood for the households to have adequate food every time.

3.2.17 Farming experience

Oyebanjo *et al.* (2013) studied the incidence of food insecurity among rural farming households in Nigeria and reported a statistically significant impact on household food security caused by farming experience. The above-mentioned authors outlined that an increase in farm experience by a single year resulted in an increase in the household food security status. Henri-Ukoha *et al.* (2013) investigated determinants of food security in female-headed households involved in individual tenure systems in Nigeria. These researchers used multiple regressions and found farming experience to have an influence on household food security. Therefore, the findings of these researchers indicate that, when farming experience increases, there is an increase in the probability for households to be food secure all the time.

Oluyole *et al.* (2009) investigated food security among cocoa farming households in Nigeria. The study employed a Probit model and found a statistically significant relationship between household food security status and that households' farming experience. This is consistent with findings of other researchers who have discovered same relationship. Igbinidu and Osarenren (2015) investigated the effect of yam-based production on the food security status of farm households in Nigeria. The study found no statistical relationship between the food security and farm experience.

3.2.18 Food Aid

Zakari *et al.* (2014), as well as Tefera and Tefera (2014), found the statistically significant relevance of household food security status and food aid. The findings of these researchers indicated that households that had access to food aid were more likely to be food secure than those that did not. In other words, an increase in food aid leads to an increase in the household food security status. However, Asmelash (2014) reported a statistically insignificant relationship between household food security status and food aid, thus concluding that food aid does not have an influence on household food security.

3.2.19 Livestock ownership

Ali and Khan (2013) used a propensity matching score technique and Poisson regression analysis to examine the impact of livestock on rural households' food security status in Pakistan. The study reported that food insecurity prevalence was more pronounced in households who did not own livestock, while those who had livestock were found to be more food secure. In addition, these researchers also emphasised that livestock ownership increased the likelihood of the rural households having sufficient food of the highest quality at all times.

Mason *et al.* (2015) investigated the determinants of food security in Tanzania. The study used the ordinary least squares technique and reported that livestock ownership indeed influenced the household food security status. Abdulla (2015) used an ordered logit regression model for examining the households' food security determinants in Ethiopia. The study reported that livestock ownership affected the household food security.

Gemechu *et al.* (2016), Kuwenyi *et al.* (2014), Mango *et al.* (2014), as well as Taruvinga *et al.* (2013), reported similar findings which reflect a statistically significant correlation between household food security status and livestock ownership. In contrast, Tekle and Berhanu (2015) found that livestock ownership insignificantly affected the households' food security. Therefore, these findings suggested no relationship between household food security and livestock ownership.

3.2.20 Droughts

Endalew *et al.* (2015) studied the food security in Ethiopia and the study employed a qualitative approach and found drought as one on the major factors that predicted the household food security. The findings of these researchers suggested that the households situated in areas that had experienced severe droughts were more likely to be food insecure, compared to those who lived in areas that had a lot of rain.

Gunatilake (2015) also used a qualitative method for examining the drought and household food security in Rural Sri Lanka. This researcher reported a significant connection between household food security and droughts. The study also emphasised a strong negative

relationship between the food security status and droughts, which indicated that, when drought increased, the household food security was negatively influenced and decreased.

Kumar and Sharma (2013) used a linear regression model to examine the impact of climate variation on agricultural productivity and food security in rural India. These authors reported a statistically significant relationship between households' food security and droughts. The study further revealed that the adverse climatic change affected the entire agricultural productivity which also negatively affected the chance of household having enough food at all times. The contradictory findings have been reported in Zakari *et al.* (2014), who found no statistical relationship between the food security status and the effect of drought on farming output.

3.2.21 Farm inputs

Verter and Becvarova (2014) used frequency and percentages for examining the yam production as a pillar of food security in Nigeria. The lack of farm inputs has been found as one of the factors that accelerated the household food insecurity in the study area. Adeniyi and Ojo (2013) studied the food security among farming households in South-Western Nigeria. The study revealed that the farm inputs had an impact on the household food security status. Hence, the households who own the modern farm inputs were more food secure than those whose farm inputs were very old.

Ibok *et al.* (2014) found labour to be one of the most important inputs in productivity, having a positive influence on household food security, while capital on the other hand was found insignificant in predicting the households' food security status.

3.2.22 Land quality

Soil infertility also has a bearing on the household's ability to be food secure. Abu and Soom (2016) assert that soil infertility influences the household food security in a negative manner. The findings of these researchers revealed that, when soil becomes infertile, the likelihood for the household to have enough food at all times decreases. Abdulla (2015) shared a statistically significant connection between household food security and soil fertility. He maintains that when soil is more fertile the chances for households to be food secure are much more favourable.

Beyene and Muche (2010) as well as Nata *et al.* (2014) also found a positive relationship between household food security and soil quality. Conversely, Asmelash (2014) found there to be a statistically insignificant correlation between the household food security status and soil quality. Therefore, these findings suggested that there was no statistically significant relationship between soil fertility and the chance for households to have adequate food of the highest quality.

3.2.23 Climatic adaptation or irrigation

Endale *et al.* (2015) identified the lack of irrigation as one of the factors that lead to an increase in households' food insecurity. Moyo and Machethe (2016) studied the relationship between smallholder irrigation and household food availability and dietary diversity in Limpopo Province of South Africa. The study utilised a descriptive analysis of variance and found irrigation to be a predictor of household food security. In addition, the study also emphasised that irrigation improved households' food availability and dietary diversity.

Research was conducted by Taruvinga *et al.* (2013) who reported that an irrigation scheme increased the chances of households having adequate food of the highest quality at all times. The availability and provision of water had an impact on the food produced. Usman (2015) examined the effect of adoption of small-scale irrigation technologies by Fadama users in Nigeria. Usman (ibid.) was of the opinion that the irrigation scheme increased the crop production which resulted in an increase of food availability and eventual food security. Kipkorir and Kareithi (2013) investigated the relationship between food security and indigenous irrigation in Kenya. The study revealed that there was a significant relationship between household food security and irrigation schemes due to the fact that the irrigation supplemented insufficient rainfall.

3.2.24 Distance to urban market

The distance travelled to the urban market also affects food supply. Anim *et al.* (2016) utilised the multinomial logit model and found the distance to the main market to be one the major predictors of the food security status in the Limpopo Province. These researchers acknowledged that the households who lived far away from the urban market were food

insecure, which indicated that those people were not able to access the kind of food they preferred.

Matchaya and Chilonda (2012), Gemechu *et al.* (2016) as well as Ali and Khan (2013) also reported a statistically significant relationship between the household's food security status and distance to the urban market. However, Mitiku *et al.* (2012) employed a logit model and found a statistically insignificant relationship between the household's food security and distance to the urban market. It is therefore clear that there is a more complicated process to determining the factors that play a role in food supply, as there are other aspects which can cause discrepancy in the contradicting findings.

3.2.25 Floods

Akuduku and Alhassan (2012) used a qualitative approach to examine the impact of the climate change to the households' food security in Northern Ghana. The study acknowledged that the floods had negative consequences on household food security in the area where the research was conducted. Muniruzzaman (2013) also utilised a qualitative technique to investigate the food security in Bangladesh and found that the floods decreased the chances for food security in the households.

Other natural disasters and challenges affect food insecurity as well. Rakib *et al.* (2014) employed the qualitative method and found that food insecurity increased during flooding in Bangladesh. Connolly-Boutin and Smit (2016), also used a qualitative approach to examine the 'climate change, food security, and livelihoods in sub-Saharan Africa. These researchers found a negative relationship between the household food security status and floods. This indicated that an increase in floods by a single unit, caused food insecurity to rise as well.

Edeh and Gyimah-Brempong (2015) investigated the determinants of food insecurity in Nigeria. The empirical findings from the multinomial logit model revealed that floods had a significant impact on households' food security in the study area.

3.2.26 Distance from the main road

Goshu *et al.* (2013) investigated the 'diet quantity and quality dimensions of food security in rural Ethiopia'. The study used a univariate Probit model which revealed that the distance from the main road had an influence on household food security in the study area. Moreover, the aforementioned authors emphasised that the households residing far away from the main road were food insecure. Zakari *et al.* (2014) also emphasised that the households living far away from the main road were more likely to be food insecure than to those who were closer to the main road.

3.2.27 Ownership of assets

Matchaya and Chilonda (2012) had different categories of assets in the linear regression model, which included: a working radio, a bicycle, a poor, thatched house, and a house. The working radio had a positive and statistically significant influence on the household's food security status which indicated that the households who used a working radio were more food secure. The study also emphasised that, when a household owns a working radio, information is easily disseminated.

The influence of livestock was also researched as an influential factor on food provision in households. Afza *et al.* (2015) used descriptive logit model to examine the impact of livestock on rural households' food security in Bangladesh. These researchers had two categories of assets which were based on small and large animals. The large animals included cattle, while small animals included goats etc. The study found small and large animals have a positive and statistically significant influence on household food security. This indicates that a unit change in asset ownership (livestock) led to an increase in food security.

Food provision and production are basic activities humans need to sustain themselves. It is clear that much research has been conducted, but that a cut-and-dried solution has not yet been arrived at. Gebre (2012) also researched ownership as a factor to influence food provision and found a negative and statistically significant impact on household food security and assets ownership. These researchers acknowledged that the households who owned assets were food secure.

Birhane *et al.* (2014) employed a multivariate regression model for investigating the urban food insecurity in Ethiopia. The multivariate model revealed that the ownership of assets had a positive influence on the food security status which indicated that, when asset ownership increased by one unit, it resulted in an increase in the probability of the households having access to sufficient food at all time.

3.2.28 Family and hired labour

Agada and Igbokwe (2016) used a logit model to examine the influence of food culture and practices on household food security in North Central Nigeria. In addition, these researchers presented a statistically significant impact on labour use (family and hired labour) and household food security status, which revealed that when both family and hired labour increased it led to an increase in the probability for the households to frequently access the best food quality. Abubakari and Abubakari (2015) also found there to be a positive impact of family labour on the household food security status.

Olagunju *et al.* (2012) used a logit model which found both families and hired labour insignificantly explaining the household food security status of the sample population in Nigeria. Garedow and Edriss (2014) studied the dynamics of the land market and food security in Malawi. The study employed a Probit model and found female family labour having no statistical relationship with households' food security in the area. Henri-Ukoha *et al.* (2013) utilised a multiple regression model and found that the labour use did not affect the household food security in Nigeria.

3.2.29 Insects/pests and diseases

Ojo and Babayo (2013) employed a qualitative approach to examine the gender contribution towards the rural households' food supply in Borno State, Nigeria. The findings of these researchers revealed that the pests and diseases were the major constraints in the food supply, which negatively affected the chances for the households to have adequate food at all times. Mahuku *et al.* (2015) examined the emerging threats to maize-based food security in Sub-Saharan Africa.

The pests and diseases were reported as one of the variables that predicted the maize production. This study emphasised that pests and diseases had a negative impact on maize

production, which consequently affected the household food security status in a negative way in the study area. Bimerew and Beyene (2014) investigated the determinants of food security of rural households in Ethiopia. The findings from the logit model indicated that the pests and insects had an influence on household food security.

In addition, the above-mentioned researchers emphasised that the presence of insects and pests resulted in an increase in household food insecurity. Verter and Becvarova (2014) also found a negative impact on the household food security and pests/insects. Srivastava (2013) employed a qualitative technique to examine the food security and plant clinic towards plant health in India. This study also confirmed that insect-pests and plant diseases were the major constraints towards the household chances to attain sufficient food.

3.2.30 Own food production

Masekoameng and Maliwichi (2014) studied factors that determined the rural households' food availability in rural areas of the Sekhukhune district in the Limpopo Province. The qualitative method was used and it was found that own food production had a positive impact on household food security. This shows that, when own food production increased by one unit, it leads to an increase in household food security. Moreover, the study emphasised that own food production supplemented the money used by the rural households to buy food from the market.

Ngongi and Urassa (2014) used a multiple linear regression model and found both the amount of maize and paddy produced to have a significant impact on farmers' productivity. The study revealed that an increase in maize and paddy production also increased the probability for the farming households to have adequate food at all times. Ndhleve *et al.* (2013) utilised an ordinal regression model to examine the household food security in a coastal rural community of the Eastern Cape Province in South Africa. The study has shown that the own-food production has no impact on the household food security status in the study area.

3.2.31 Output of food crops

A study by Oluyelo *et al.* (2009) employed a Probit model and found the food crops to have a positive influence on household food security. In addition, the study emphasised that an

increase in food crops lead to an increase in the chances of households attaining the sufficient food of the highest quality. Agbola (2013) found that the output of food crops increased the likelihood for households to be food secure.

The land use and profitable ways utilized by farmers to enhance crop production are also relevant to a study of investigating food provision. Saka *et al.* (2011) used a multiple regression analysis and found that land use had a significant impact on crop production. The study emphasised that land use increased the output of food crops, which consequently increased household food security. In contrast, Langat *et al.* (2011) examined the household food security in a commercialised subsistence economy in Kenya and reported that most of the households in Kenya grew cash crops, but the majority of them still failed to attain the adequate food.

3.2.32 The number of employed persons in a household

Chinnakali *et al.* (2014) used a logistic regression model and found the number of employed persons in a household to have a positive influence on the food security status in India. This indicates that a single unit change in the number of employed persons in a household resulted in an increase in the probability of households accessing adequate food. Aslam and Rasool (2014) investigated the determinants of household food security in Pakistan.

The ordinary least squares technique was used and it was found that the number of employed persons in a household had a statistically significant influence on food security, which revealed that when the number of employed people increases by one person in a household there is an increase in food security as well.

Parsavala *et al.* (2013) used a qualitative approach and found the number of employed persons to have a significant impact on household food security. Moreover, the study showed that, when the number of earners increases in a household, it results in an increase in the likelihood for the households to have sufficient food every time.

3.2.33 Household members in school

Asogwa and Umeh (2012) reported that household members who attending school have a large role in predicting the households' food security status. These authors emphasised that

an increase in the number of schooling members in the households resulted in an increase in household food insecurity. Magana-Lemus *et al.* (2016) studied the household food security in Mexico. The logistic regression model was employed and it was found that an increase in the number of children in school lead to an increase in food insecurity. Therefore, the findings of these scholars suggest a negative relationship between household food security status and the number of households in school.

3.2.34 Food purchased from the market

Baiphethi and Jacobs (2009) investigated 'the contribution of subsistence farming to food security in South Africa'. The empirical findings revealed that about 90% of the food was purchased from the market, while the subsistence farming constituted only 10% of the households' farming production. Thus, the findings of these researchers showed that the majority of the households in South Africa depend heavily on purchased food.

Ndheve *et al.* (2013) reported that food purchased from the market played a significant role in predicting the household food security. In addition, these researchers revealed that food purchased from the market increased the probability of households having sufficient food at all time.

3.2.35 Practising farming

Omotesho *et al.* (2014) assessed the food security determinants among rural farming households in the Kwara State of Nigeria. The farming households were found food secure compared to those who did not engage in farming activities. In addition, the above-mentioned researchers revealed that the households who practiced farming had greater chances of having adequate food.

Oyebanjo *et al.* (2013) found that households that practiced farming have a positive influence on the household food security status in Nigeria. This indicated that, when farming increased by a unit, in the result was an increase in the probability of households having continuous access to sufficient food of the best quality.

3.2.36 Household membership of farm association

Obisesan *et al.* (2013) employed a Tobit model to examine the determinants of fertiliser use among smallholder food crop farmers in Nigeria. The empirical findings revealed that the households' membership in farming organisations increases the chances of farmers having adequate food crops. Henri-Ukoha *et al.* (2013) utilised a multiple regression model and found there to be a statistically significant correlation between the household food security status and membership in the farming association.

Thus, these findings have indicated that membership of farming association increased the likelihood for households to have sufficient food at all times. Chepng'etich *et al.* (2015) used a logistic regression and found there to be a positive relationship between sorghum production and household membership in farm associations. Moreover, the study emphasises that the production of sorghum led to an increase in the household food security status in Kenya.

3.2.37 Conclusion

This chapter has discussed the variables that were used by most of the researchers to examine the household food security status in different contexts. For example, some of the studies were undertaken abroad while other studies were conducted within the African continent. These researchers used various variables and produced different outcomes. Some of the scholars found a few of their variables to be the main predictors of the household food security status. While alongside, some of the researchers found a few of their explanatory variables as insignificant in influencing the household food security status.

CHAPTER 4: RESEARCH METHODOLOGY

4.1 Introduction

This chapter provides the methodological framework that was used to gather the relevant data from participants in the Mbizana local municipality. Chapter 2 examined theoretical and conceptual framework that underpins the household food security status and Chapter 3 discussed the factors that influence the food security status at household level.

The first section, which is 4.2, gives a detailed explanation of the study area, as well as the demographic structure of the population in the study area. Section 4.3 of the study provides the research design employed in the study, whilst section 4.4 explains the sampling and sample size of the study. Subsection 4.4.1 provides a detailed explanation based on sampling methods, whilst subsection 4.4.2 shows the sample size of the study.

Section 4.5 discusses the instrument and data collection process that was used to collect the data in the study area. Section 4.6 shows how the questionnaire was designed and section 4.7 explains the process or procedures that were employed during the pilot study. Section 4.8 describes how the scores were calculated in dietary diversity, while 4.9 shows how the variables were measured in the study. Subsection 4.9.1 gives a measurement of a dependent variable, whilst subsection 4.9.2 explains the whole process of constructing the dependent variable. In addition, subsection 4.9.3 provides a detailed explanation based on how the predictor variables were measured in this study.

Section 4.10 shows the ways of selecting the model and subsection 4.10.1 provides a discussion of the logistic regression model. This is followed by subsection 4.10.2, which shows the model specification of the study. The last section, which is section 4.11, reveals the types of diagnostic tests that will be used in the next chapter. These diagnostic tests include the Hosmer-Lemeshow and Wald test statistic, as explained below in sub-section 4.11.1 and 4.11.2. In addition, the last section, 4.12, provides a conclusion to the chapter.

4.2. Description of the study area and population

This subsection provides a detailed description of the Mbizana local municipality, a rural area located in the Eastern Cape, where the study was conducted. The said local

municipality is situated within the Alfred Nzo District Municipality. As can seen in Figure 4.1, this municipality has 31 wards which incorporate the main town, known as Bizana, and rural areas under the control of the traditional leaders and municipal councillors.

The above-mentioned local municipality is located on road R61, which connects the KwaZulu-Natal South Coast boundary to the national road N2, leading to uMtata. This municipality covers an area of approximately 2 806 km^2 (ANDM IDP, 2014). The population in the Mbizana local municipality is approximated at 281905, with 48 447 households. The distribution by gender in the said local municipality revealed that the number of females was estimated at 153 573, whereas males were approximately 128 332 (Stats SA, 2011).

The population distribution of the aforementioned municipality shows that the area is dominated by South African, black Africans, who constitute about 99.58% of the total population, followed by Coloureds, Indians, other Asians, Whites and other, 0.17%, 0.11%, 0.09% and 0.04%, respectively. The age distribution in the study area indicates that the municipality has a large number of young people, since the youth between the ages of 0 to 34 years constitutes about 77% of the total population (MLM IDP, 2014).

Whist elderly people, from the age of 60 years and above, are estimated at only 6.5% in overall terms, the unemployment rate in the area is approximated at 44%, which also includes people who are not actively looking for jobs. Moreover, the literacy level in the study area is very low, because the number of people who attend pre-school, primary and secondary education level is less than 50% on average. In addition, the number of people who attend the tertiary institutions is very low, because it accounts for less than 1.5% of the total population (MLM IDP, 2014).

It is of crucial importance to note that the Mbizana local municipality does not have industries and depends heavily on the primary sector, which includes the agriculture and forestry sectors. Forestry is regarded as the most job-generating sector in the municipality, even though the maximum employment in this sector is not yet achieved (MLM IDP, 2014).

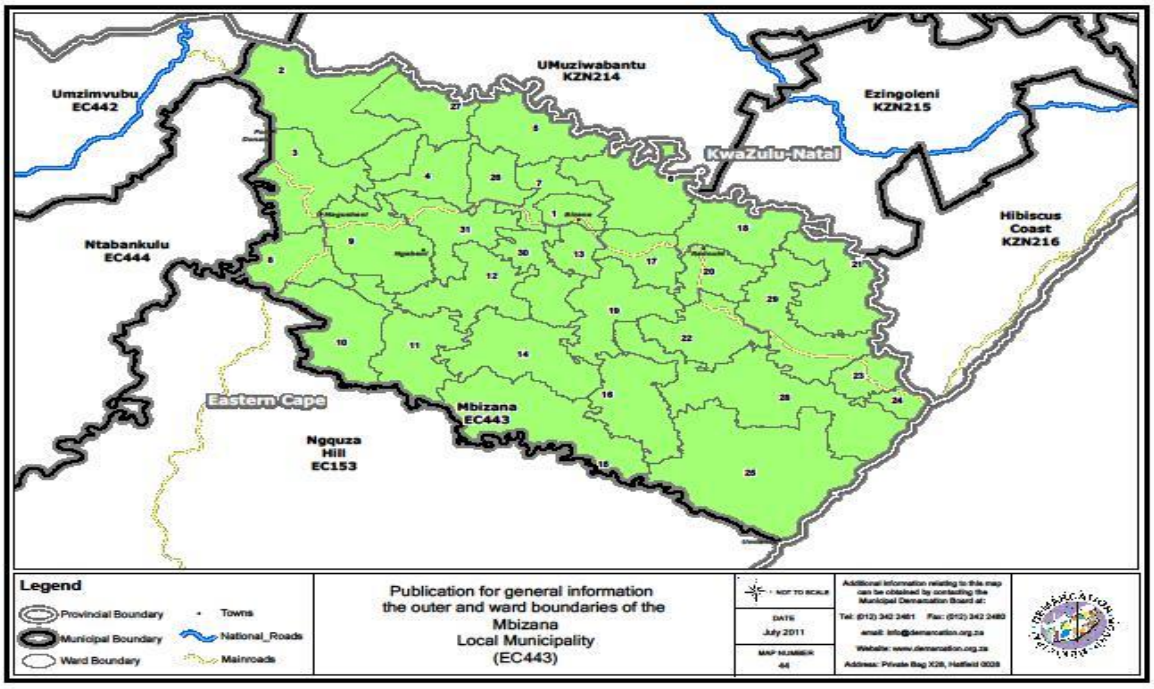


Figure 4.1: Map 1: Mbizana Locality map showing ward boundaries (Mbizana local municipality IDP 2014/15 review)

4.3 Research design

A research design serves as a master plan that reveals the type of data that is needed in a research study and also indicates how the data will be collected and interpreted in order to determine the importance of the study which is under examination (Thomas, 2010). This study employed a cross-sectional, descriptive survey design to examine the determinants of household food security status among the rural indigent households in the Mbizana local municipality. The research design for this study enabled the researcher to examine the demographic and socio-economic variables that influence the food security status of the household in the chosen study area.

The relevant data were gathered by the use of a structured and self-administered questionnaire. Therefore, the questionnaire was used in the study as the main research instrument for data collection. The quantitative data were analysed by the use of cross tabulations and the logistic regression model to examine the most important predictor

variables that influence the food security status of the households in the aforementioned local municipality.

The study used different software for data analysis. The software includes STATA, which was utilised to run the data to find out the factors that predict the households' food security status in the study area. The Statistical Package for the Social Sciences (SPSS) version 25, available at the University of Zululand, was used to run the cross tabulations for each predictor variable, while the E-views were used to perform the diagnostic tests to examine the validity and reliability of the estimated coefficients.

4.4 Sampling and sample size

Sampling is defined as the process of picking up a few participants from the main population (Kumar, 2005). The researcher must select the appropriate sample size that can be used to represent the whole population in a research study (Finn *et al.,* 2000).

4.4.1 Sampling techniques

The sampling techniques involve probability and non-probability sampling. In non-probability sampling, the respondents are not randomly selected and this type of sampling does not have features of probability, meaning that each subject does not have a similar chance of being selected. There is an inbuilt bias in collecting such data, because the design allows some subjects to be preferred to others. The non-probability sampling has about seven categories of commonly used sampling, namely: snowball, purposive, quota, convenience, deviant case, volunteer and case study sampling approaches. In contrast, the probability sampling refers to the process where the respondents have an equal chance of being selected to participate in a research study (Creswell, 2014). The probability sampling is divided into four categories, namely: simple random sampling, systematic random sampling, stratified random sampling, and multistage cluster sampling (Creswell, 2009).

The systematic random sampling is regarded as a preferable sampling technique, which is normally used when it is difficult to use the sampling frame. The systematic random sampling is similar to a simple random sampling. The above-mentioned selection technique indicates that the respondents have to be selected from the list and it does not matter where the researcher started to select the participants from the list. Moreover, the random

sampling enables the researcher to draw inferences about the entire population. In addition, the non-probability sampling is not preferable for use in a research study (Creswell, 2014).

4.4.2 Sampling design of the study

The study focused on the Isikelo community of the Mbizana local municipality, where permission was granted to conduct the research. The Isikelo Community comprises of 4 wards, of which three were randomly chosen for investigation. These wards included Ward 4 (Umdeni, Ludeke etankini, Ludeke section D, and Mdikiso), Ward 5 (Mtamvuna, Mmangweni, Ndayingane, Mbhobheni, Nqwelo Yombaso, and Gwala), and Ward 26 (Mount Zion, Mbhobheni G section, and Nomlacu). All the wards in the Mbizana area are considered to be similar in characteristic with regards to the type of dwelling, land size, social and income status, hence one may use the findings (albeit gained from data from three wards to make generalisations about the entire Mbizana local municipality population).

The systematic random sampling was used to select the participants in the area, due to its periodic quality and simplicity. This is a method of choosing a random sample from a larger population. The process of systematic sampling normally involves first selecting a fixed starting point in each ward and then obtaining succeeding observations by using a constant interval between samples taken. Suppose the population was 1000, a random systematic sampling of 100 data points within that population would involve observing every 10^{th} data point.

Since it was difficult to find the sample frame of the households in each ward, the study opted to target every 5^{th} household, and if that householder was unavailable or unwilling to get involved, then the immediate neighbour was selected, and thereafter the 5^{th} household was selected. Some wards possessed clearly demarcated roads and, in such instances, every second road (or lane) was selected and we continued thereafter to select every fifth householder. In this manner, the researcher and four trained field workers succeeded in collecting a sample of 330 householder participants. Furthermore, each householder or a representative was interviewed once and where the questionnaire was fully completed we proceeded to the next one. Additionally, it is important to note that the statistics for the

households who refused or those were not available at home to participate in the study during the period of data collection was not observed.

Hill (1998) outlined that a random sample of 30 to 500 participants is acceptable. If the sample is homogenous, then 30 would suffice, however, if there is significant variation in the population samples, approaching 500 would be preferred. In our sample, the householders were quite homogenous, however, a small number of householders had claimed cash from the land restitution programme, and the study endeavoured to collect a sample of 330. When the researcher noticed that similar patterns were emerging, from the information contained in the questionnaire, and no additional information would be gained in moving beyond 330, the researcher decided to stop the fieldwork.

In addition, the number of households in Ward 5 (which include the following locations: Mtamvuna, Mmangweni, Ndayingana, Mbhobheni, Gwala, and Qwelo yombaso) were roughly estimated at 2089, while in Ward 26 (which include Nomlacu, Horen, Mount Zion, and Mbhobheni G section) households were estimated at 2178. Moreover, the estimated number of households in Ward 4 (Mdeni, Ludeke etankini, Ludeke section D, and Mdikiso) was more than 3000. The above estimates were given by the ward councillors of the said locations, even though they were not sure about the exact numbers.

Therefore, the number of questionnaires that were administered in each ward was based on the proportion of the estimated number of households. In both Wards 5 and 26, the number of households was almost the same and hence, the same proportion of the questionnaires (100) was successfully administered in each ward, while 130 questionnaires were administered in Ward 4. In addition, the selection of the above-mentioned wards was motivated by the fact that in the study area, the people share similar sources of income, methods of farming, as well as, the same culture and values, particularly in rural based areas.

In addition to that, the researcher grew up in the said municipality and possesses an intimate understanding of the way of life in the surrounding rural segments of Mbizana. However, the selection of the aforementioned wards can assist us to draw inferences about the whole population in the Mbizana, since people in the area share the same culture and values.

Moreover, the main objective of the study was to examine the important factors that could predict the food security status of the rural, indigent households in this community.

4.5 Instrumentation and data collection

Before the data collection process started, permission was granted by the chief of the Isikelo community. Thereafter, arrangements were made with municipal councillors, as well as the local headman (usibonda), to inform the community about the study and the letter was attached in the appendices. In this research, the primary data were collected using a structured and self-administered questionnaire, as mentioned in the research design. Moreover, some of the participants were assisted to fill the questionnaires while others who had indicated that they can fill them on their own were given a chance to do so under the guidance of a researcher or an assistant.

The statistical data that were collected was based on demographic and socioeconomic and dietary factors of the rural indigent households. Therefore, a questionnaire was used as the main data collection tool in the above-mentioned study area. Additionally, the process of collecting the data occurred from December 2016 to February 2017. Four trained research assistants were hired to collect the data because the sample size of the study was too large.

These individuals were chosen to assist during the data collection because they possessed a matric certificate as a minimum employment requirement. Training took almost a week where each and every question in a questionnaire was clarified. In addition, ethical issues were also emphasised and leading answers during data collection were prohibited.

The questionnaire was translated into Xhosa as the main spoken language in rural areas in the Mbizana local municipality. The data collection was based on face-to-face interviews and the targeted population were the heads of the household. But in a case where the household head was not available at home, any adult (18 years old and above) who belonged to the household was asked to provide the information about the head of the household, as well as the general information for the entire household. The purpose of the study was explained to the participants before they provided us with the information.

Moreover, the participants were not forced to participate in the study, but they were pleased to assist by providing us with relevant information. The informed consent form was provided,

and it was also explained well that the participants or respondents had a right not to participate in the study if they did not want to do so and they were informed that they could stop answering the questions at any point in time without any fear. Lastly, the participants were told that there were no personal benefits accruing from participating in the study and they were also informed that the study would benefit the entire society and they would be informed of the outcome of the research by May 2018.

4.6 Questionnaire design

Both open-ended and closed-ended questions were designed for a face-to-face interview using a well-structured questionnaire. The open-ended questions gave the participants the freedom to express their views. In contrast, the closed-ended questions gave the participants only two options, which were based on a 'yes' or 'no' answer to the questions. The main intention for undertaking the face-to-face interviews was to attain the responses of the highest quality, whereby each and every question was clarified to the participants by trained field workers.

The questionnaire comprised five sections. The first section consisted of the respondent and household's demographic details. This was also utilised when the respondent was not a head of the household, and then followed the household head's details, which included variables such as gender, age, education level, marital status, employment status and health status of the household head. The second section embraced services and infrastructure, while the third section comprised agricultural activities. The fourth section covered food accessibility and the fifth referred to availability.

Food availability was examined using the household food insecurity access scale developed by USAID in 2007. This scale includes occurrence and follow-up questions. The food security status was calculated based on the coding pioneered by Coates *et al.,* (2007). The household food insecurity scale was based on 'never happened', 'rarely', 'sometimes' and 'often'. Where 'never happened' had a score of 0, 'rarely' took a value of 1, 'sometimes' was given the value of 2, and 'often' was given a score of 3.

The household food availability was followed by a 24-hour recall, where the households explained the type of food and beverages taken on the previous day before the survey. They

explained the type of food and beverages taken during breakfast time, lunch and during supper. The 24-hour recall was followed by dietary diversity which comprised of16 food items consumed on the day before the survey took place.

4.7 Pre-tested questionnaire

Before any actual survey takes place, it was very important for a researcher to prepare the questions for a pilot study. In this research study, a pilot study was conducted and eight questionnaires were distributed in order to verify the validity and reliability of questions that were prepared for a pilot. The respondents that were selected resided in the Mbizana local municipality at the time the study was conducted and they were randomly selected. All of the questionnaires were translated into IsiXhosa and also explained to the participants using the language spoken in the Eastern Cape Province.

The selected participants appeared to have understood the questions contained in the survey instrument for they all responded to the questions consistent with their circumstances. Hence, no changes were made to the questionnaire. The elementary objective of conducting the pilot study was to test whether the questions were clearly understood and address the research questions of the current study or the issues intended to address. In addition, the pilot was not conducted for only examining whether the participants understood the questions, but it was undertaken to verify whether it gave the expected responses and to check the consistency in terms of the meaning and expression attached to them.

4.8 The dietary diversity in relation to household food security status

Dietary diversity is regarded as a proxy of food security status and is measured using the number of food groups consumed by households in a given time period. Normally it involved 24-hour recall, whereby the participants had to give a detailed explanation based on the number of food categories consumed in the household a day before the survey took place (Ruel, 2002; Taruvinga *et al.,* 2013). However, Kennedy *et al.* (2013) outlined that there are no official cut-off points used, based on the number of food groups consumed by either individuals or household members, in order to draw an accurate conclusion about the adequacy of diet.

Mbwana *et al*. (2016) and Taruvinga *et al.* (2013) followed Ruel (2003), who had created three strata, which were based on low, medium and high dietary diversity. In this approach, the dietary diversity scores were calculated based on twelve food groups. The minimum score was zero and the maximum was 12. The low diversity was denoted by a score of 0 to 3 points, medium 4 to 6 and high diversity was indicated by 7 to 12 points. However, in the questionnaire of the current study there were 16 food groups but some food groups were combined and only given one point. These food groups include vegetables, fruits and meat (see Kennedy *et al.,* 2013).

Table 4.1. shows how scores were assigned to each food group. According to the above-mentioned researchers, the households that fall in the low dietary diversity category are regarded as food insecure, while those that have a wide variety of food groups in their consumption are food secure. However, in this study, the dietary diversity was specifically used to assess the households' consumption pattern and hence, it was also used in the logit model to estimate the factors that influence the household food security status.

Table: 4.1 Food groups

Food groups	Points
1. Any bread, rice, noodles, biscuits, or any other foods made from millet, sorghum, maize, rice, wheat or any other locally available grain	1
2. Any potatoes, yams, manioc, cassava or any other foods made from roots or tubers	1
3. Any vegetables	1
4. Any fruits	1
5. Any beef, pork, lamb, goat, rabbit, wild game, chicken, duck, other birds, liver kidney, heart or other organ meats	1
6. Any eggs	1
7. Any fresh, dried fish or shellfish	1
8. Any foods made from beans, peas, lentils or nuts	1
9. Any cheese, yoghurt, milk or other milk products	1
10. Any foods made with oil, fat or butter	1
11. Any sugar or honey	1
12. Any other foods such as condiments, coffee or tea	1
Total Points	**12**

(Taruvinga *et al.,* 2013).

4.9 Measurement of variables

Variables that were included in this study, as important factors which influence the household food security status, were chosen based on the fact that these variables were previously tested in various empirical research studies. In addition, the measurement of each predictor variable was clearly indicated and supported by the empirical research findings from the previous research studies.

4.9.1 Dependent variable

The dependent variable in this study was measured as dichotomous or as the binary outcome variable. This indicates that the response variable was categorised into two

groups: food secure and food insecure households. In addition, the food secure households were characterised by 1, whilst food insecure households were denoted by 0.

The study employed two approaches to estimate the dependent variable, the first being the estimates gained from the dietary diversity relationship discussed in section 4.8 above and in Table 4.1. The second approach involved the household food insecurity access scale (HFIAS) as developed by USAID in 2007 and discussed under section 4.9.2 below. Both approaches have their strengths and weaknesses. The dietary diversity approach is more accurate for respondents who were asked to recall their diet for the past 24 hours.

However, the limitation of the approach is that if the diet of the past 24 hours is not the norm – the respondent had an out of the ordinary excellent or poor diet – then an inaccurate account would be recorded. In contrast to this, the HFIAS approach attempts to establish the norm over the last 30 days. With regards to the dietary diversity approach, the householders who scored 5 or less were deemed to be food insecure, while those who scored 6 or more were considered to be food secure.

Initially the study strove to employ the three categories such as low, medium and high dietary diversity, to be assessed via the multinomial logistic regression modelling, but due to lack of sufficient variation in all three categories, the study opted to reduce the dependent variable to that of a dichotomous variable suitable, as explained above, for investigation under a logistic regression framework.

$$HFSi = \begin{cases} 1, & \text{Food secure } (\text{score} \geq 6) \\ 0, & \text{Food insecure } (\text{score} \leq 5) \end{cases}$$

4.9.2 Household Food Insecurity Access Scale

The dependent variable in this study was computed using the household food insecurity access scale. The Household Food Insecurity Access Scale (HFIAS) was developed by USAID in 2007 and it is commonly used by various researchers as a tool to differentiate food secure from food insecure households. This scale is known as the standard method used across the world to estimate/measure the food security status either at the individual or household level (Kennedy *et al.,* 2011).

The household food insecurity access scale has two categories. The first one entails nine occurrence questions and the second category has nine corresponding frequency of occurrence questions. The kinds of questions that were asked to the respondents (adults from 18 years old and above), or the heads of the household in the Mbizana local municipality, were based on whether the condition of food insecurity ever happened in the household over a period of 30 days (four weeks). Moreover, the occurrence questions were based on yes or no.

Moreover, in the cases where the respondent or the head of the household had answered yes to the occurrence question, the interviewer asked the frequency of occurrence question. For example, the frequency of occurrence questions was based on how many times the condition of food insecurity occurred in the household. The frequency of the occurrence question ranged from rarely (once or twice in the preceding four weeks), sometimes (three to ten times in the previous four weeks) and often (more than ten times in the previous four weeks). In the case where the household has answered no to the occurrence question, then the frequency of the occurrence question was omitted (Coates *et al.,* 2007).

The HFIAS demonstrates that the degree of food security can be divided into four categories as follows:

- Food secure;
- Mildly food insecure;
- Moderately food insecure, and
- Severely food insecure.

According to Coates *et al.* (2007), the households who indicated that they never experienced any kind of food insecurity or were just worried not to have enough food, were categorised as food secure, which indicates that the households who fall in this category were given a value of 1 (food secure).

Food insecurity is divided into three components. The first one is known as mildly food insecure, which occurs when households have a fear of not having sufficient food, irrespective of whether the condition used to happen rarely or every time. This mildly food insecure condition also happens when households eat undesirable foods, but not often. In

addition, the households who are categorised as mildly food insecure are households who do not go to bed without eating anything; they have something to eat and they do not stay without food for an entire day (Coates *et al.,* 2007). The second category of food insecurity is known as moderately food insecure, which occurs when households frequently eat un-preferable food, meaning that they compromise the quality of food more often. And these households who are regarded as moderately food insecure are the households who have started to reduce the size of the meal eaten per day. But they do not experience any kind of severe food insecurity, such as going to bed with an empty stomach and do not go the whole day and night without eating anything.

The third kind of food insecurity is known as severe food insecurity, which takes place when households frequently reduce the size of the meal per day. Alternatively, the households who are considered as severely food insecure undergo three severe food insecurity conditions, such as sleeping without eating anything beforehand, not having food to cook, and going the whole day or night without eating.

Furthermore, the above food insecurity categories were captured in the household food insecurity access scale (HFIAS) that was used to segregate food secure from food-insecure households in the Mbizana local municipality. Therefore, any respondents or the heads of the household who showed that they experienced any of the three categories of food insecurity conditions discussed above were categorised as food insecure. This indicates that the households who fall in the food insecure category were denoted by the value of 0 (food insecure).

Additionally, the dependent variable in this study is dichotomous in nature, where it takes on either a value of 1 for a food secure, or 0 for food insecure households.

4.9.3 Independent variables

The independent variables that are employed in this study were chosen on the basis that they were previously used in various empirical research studies. In addition, these predictor variables are also supported or justified by the economic theory and empirical studies discussed in Chapter 3.

Table 4.2 portrays the predictor variables that were included in the binary logit model

Code	Type	Description
Hhs	discrete	Number of household members
Hhhag	Continuous	Household head age in years
Hhinc	Discrete	Household total monthly income
Hhhg	Dummy	1, Male
		0, Female
Hhhms	Dummy	1, Married
		0, Never married, divorced or widowed
Hhhed	Dummy	1 Has formal education
		0, No formal education
Hhsg	Dummy	1 Has social grants
		0, No social grants
Hhrem	Dummy	1, Have remittances
		0, No remittances
Subs-farming (Own food production)	Dummy	1 Has own food production
		0 Otherwise
Finc	Dummy	1 Has farm income
		0 otherwise
Hhhemp	Dummy	1 When a household is self-employed/employed by someone
		0 Otherwise
Lr	Dummy	1 When a household claimed cash for land

		0 Otherwise
Livest-ownship	Dummy	1 When households have livestock ownership
		0 Otherwise
Impr-seeds	Dummy	1 When households use improved seeds
		0 Otherwise
Mcooper	Dummy	1 When a household has membership in farming cooperative
		0 Otherwise
Pests & diseases	Dummy	1 When households' farming output is affected by pests and diseases
		0 Otherwise

(Author's compilation)

Household size

This is a discrete variable which was measured in terms of the number of family members and it is hypothesised that an increase in household size results in an increase in food insecurity. Household size increases the household food insecurity, based on the assumption that when the number of family member increases, the food consumption also increases. The empirical study that was undertaken by Asogwa and Umeh (2012), and Muhoyi *et al.* (2014) confirmed that an increase in household size leads to an increase in household food insecurity.

Household age

This is a continuous variable measured in years of the household head. The age of the household head is hypothesised to have an influence in predicting the household food security status. This variable is expected to influence the household food security status, either in a positive or negative way. Zakari *et al.* (2014) investigated the factors that predict the food security status of the households who live in West Africa, specifically in Nigeria.

These researchers found a positive and statistically significant impact between the age of the household head and food security status in the study area.

Household total monthly income

This is a discrete variable which is expressed in terms of rands. The household total monthly income refers to the aggregate income of the household members. The total monthly income is calculated by summing up the income of the household members. This variable is hypothesised to have a positive impact on household food security status and as the household total monthly income increases, results decrease in the case of household food insecurity. The empirical studies that have been conducted based on determinants of food security, found the total income among other factors exert a positive and significant effect on household food security status. These studies include Mannaf and Uddin (2012); Motbainor *et al.* (2016); and Mahmood *et al.* (2014).

Gender of the household head

This is a dummy variable which takes a value of 1 when a household head is a male and 0 for female-headed households.

$$HHHG = \begin{cases} 1, & \text{Male} \\ 0, & \text{Female} \end{cases}$$

The gender of the household head is hypothesised to affect the household food security status in a negative manner. For example, the female-headed households might be vulnerable to high poverty and food insecurity compared to male-headed households. The study that was conducted by De Souza Bittencourt *et al.* (2013) found that female head households experience more food insecurity than male headed households.

Household heads education status

In this study, the household head education status was measured as a dummy variable taking a value of 1, where a household head had secondary education, matric and above), and 0 otherwise.

$$HHHED = \begin{cases} 1, & \text{Have secondary education and above} \\ 0, & \text{Never went to school and primary} \end{cases}$$

This variable looks at whether a household head is educated or not. The hypothesis in this variable is based on the fact that the household heads who went to school have more food security compared to household heads who never went to school. For instance, the educated household head can easily access the information on food of the good quality, while others not. Musemwa *et al.* (2013) and Adepoju and Adejare (2013) attested that the household head's education status predicts the household food security, and the educated household heads were found to have greater chances for attaining adequate food at all times.

Household head's marital status

In this study, marital status was measured as a dummy variable, where married household heads were denoted by 1, and never married, divorced or widowed household heads were denoted by 0.

$$HHHMS = \begin{cases} 1, & \text{Married} \\ 0, & \text{Never married, divorced or widow} \end{cases}$$

The marital status of the household head is hypothesised to influence the household food security status. This study hypothesised that the married household head is more likely to be food secure compared to the never married woman, widow or divorced/separated households. Grobler (2013) found that marital status has an influence on the household food security status, where married women were found to be more food secure than their counterparts.

Household remittances

This is a dummy variable which takes a value of 1, when a household has remittances and those that do not are given 0. The remittances are explained as other sources of income, such as income from other family members or relatives who are working.

$$HHREM = \begin{cases} 1, \text{Have remittances} \\ 0, \text{No remittances} \end{cases}$$

This variable is hypothesised to have a positive influence on household food security status. The household that has remittances is more likely to have adequate food at all times, compared to households who do not have remittances. This hypothesis is supported by the

empirical work from different researchers. The study by Mango *et al.* (2014) confirmed that remittances have a positive impact on household food security status.

Household social grant

This is a dummy variable which takes a value of 1 when a household has a government social grant, and 0 for the households who do not receive any government social grants.

$$HHSG = \begin{cases} 1, \text{Have social grants} \\ 0, \text{No social grants} \end{cases}$$

The household social grant is hypothesised to influence the household food security in a positive manner. For example, the households who do not receive the government social grants are more likely to experience food insecurity, compared to the households who receive the social grants. Sakyi (2012) found the social grant as one of the factors that affect household food security, and the ones who received the social grants were more food secure than non-recipients of the social grant.

Household head's employment status

The study employed a dummy variable to examine the influence of the household head employment status on household food security status of the sampled households.

$$HHHEMP = \begin{cases} 1, & \text{Employed/Self_employed} \\ 0, & \text{Part time, unemployed or not in labor force} \end{cases}$$

The household head's employment status is hypothesised to predict the household food security status in a positive way. This means that the researcher expected the likelihood of being food secure to increase in employed/self-employed household heads as compared to part-time, unemployed or not in labour force household heads. This hypothesis is in line with the findings that were presented in Gebre (2012), who investigated the food security determinants in Ethiopia and found that as household heads find jobs, food insecurity decreases.

Subsistence farming (own food production)

Subsistence farming (own food production) is measured as a dummy variable which takes a value of 1 when households participate in farming activities for own use, and 0 when they do not.

$$SUBS - FARMING = \begin{cases} 1, & \text{Have subsistence farming} \\ 0, & \text{Do not engage in farming activities} \end{cases}$$

The households who engage in farming for their own use are expected to be more food secure, compared to those who do not produce anything for the consumption of their households. Tibesegwa and Visser (2015), outlined that subsistence farming increases the food security status, particularly in female headed households, compared to male counterparts. Baiphethi and Jacobs (2009) maintained that small scale farming plays a vital role in reducing the number of food insecure households in both rural and urban areas, which improves survival of households, and also prevents price escalation.

Farm income (crops only)

This variable is measured as a dummy which denotes the households who sell some of their farm produce after the harvest as 1, and 0 for those who do not.

$$FINC = \begin{cases} 1, & \text{Sell some of the produce} \\ 0, & \text{Do not sell any produce} \end{cases}$$

The households who sell part of their produce are expected to be less food insecure, because it increases the income of the households, and consequently leads to a rise in food accessibility. Asogwa and Umeh (2012) found a positive and statistically significant impact between food security status and farm income. These authors asserted that an increase in farm income results in a rise in household food insecurity.

Land restitution programme

In the Isikelo community, the households who were removed from their land during the apartheid system received cash from the government as compensation. This variable takes a value of 1 if household received cash from the land restitution programme, and 0 if they did not.

$$LR = \begin{cases} 1, & \text{Received cash from land restitution} \\ 0, & \text{Did not received cash from land restitution} \end{cases}$$

Valente (2009) studied the household food security status in South Africa and reported that the widespread of food insecurity was found within the group of households who benefitted from land claims, compared to those who did not.

Livestock ownership

Livestock ownership is measured as dummy variable that is characterised by 1 for the households who have livestock, and 0 otherwise. In this study, the small (goats and sheep) and large (cattle) livestock were combined. Therefore, the household who owns one of the above-mentioned livestock was coded as 1, and 0 otherwise.

$$LIVEST - OWNSHIP = \begin{cases} 1, & \text{Own livestock} \\ 0, & \text{Do not have livestock} \end{cases}$$

Obuoyo *et al.* (2016) maintained that livestock ownership has a significant influence on households' income and enables them to have more access to food. Thus, food accessibility as one of the four important pillars causes an increase in food security.

Improved seeds

This is a dummy variable where the households who use treated seeds are indicated by 1, and 0 otherwise.

$$IMPR - SEEDS = \begin{cases} 1, & \text{use improved seeds} \\ 0, & \text{Do not use improved seeds} \end{cases}$$

The study by Tefera and Tefera (2014) revealed a positive and statistically significant relationship with food security and use of improved seeds. These researchers further pointed out that as use of improved seed increases by a unit, specifically in farming households, food security also rises.

Membership in farming cooperative

Membership in farming cooperatives is measured as a dummy variable where households who have joined any farming cooperative are characterised by 1, and 0 for those who do not participate in farming cooperatives.

$$MCOOPER = \begin{cases} 1, \text{Have membership in farming cooperative} \\ 0, \text{Do not have membership in farming cooperative} \end{cases}$$

Nugusse *et al.* (2013) found a positive association between the membership in a cooperative and food security. In addition, these authors maintained that being a member in a cooperative increases the chances for the households to be more food secure, compared to households who do not participate in social cooperatives.

Pests and diseases

The variable was measured as a dummy which takes a value of 1, where households' farm output was affected by pests and diseases, and 0 otherwise.

$$PESTS\ \&\ DISEASES = \begin{cases} 1, \text{ If affected by pests and diseases} \\ 0, \text{Not affected by pests and diseases} \end{cases}$$

The study by Zakari *et al.* (2014) found a negative relationship between pests and diseases, and food security. Moreover, the above-mentioned researchers outlined that the presence of insects and diseases affects the farming output in a negative way, which leads to a decrease in food production and later affects the food security status.

4.10 The model

This section gives a description of the logistic regression model, wherein different kinds of regression models are clearly explained, and it is also outlined when to use certain modelling, such as linear or a logistic regression models.

4.10.1 Logistic regression model

A regression model is used to estimate the statistical relationship between the dependent variable and one or more independent variables. Even though the regression model deals with the estimation of the response (dependent) variable and independent variables, it does not imply that the explanatory variables automatically have a causal impact on the dependent variable and the response variable is not a causal effect. Subsequently, if there is a causal impact on the response, and the explanatory variables, it has to be justified by the economic theory (Gujarati & Porter, 2009).

In addition, the dependent variable is denoted as Y, while X represents the explanatory variables included in the regression model (Gujarati & Porter, 2009). The logistic regression model is used when the response variable is not continuous, and this type of modelling is regarded as a logit model and very important, because it caters for both continuous and categorical independent variables (Koop, 2013).

According to Alexopoulos (2010), there are many types of regression models. The very same researcher has outlined that ‘‘the type of the regression model depends on the type of the distribution of Y; if it is continuous and approximately normal, we use linear regression model; if dichotomous we use logistic regression; if Poisson or multinomial we use log-linear analysis; if time-to-event data in the presence of censored cases (survival-type) we use Cox regression as a method for modelling." Alem (2007) outlined that the logit model has a powerful predictive capacity, as opposed to other logistic regression models.

This research study follows a binary logit model, because the response variable for the current study has two discrete outcomes: 1 for food secure households and 0 for food insecure households. Moreover, this model was chosen based on its powerful predictive capacity as outlined on above.

4.10.2 Model specification

This study used a dichotomous or a binary response variable. It means that the dependent variable has been categorised into two, where food secure households are denoted by 1, whereas food insecure households are indicated by 0. The probability that a particular household falls in food secure category can be expressed as:

$$P(Y=1)= \frac{1}{1+e^{-Z_i}} \quad \ldots\ldots 1$$

Where $P(Y_i = 1)$ represents the probability of being food secure, whereas Z_i denotes the vector of predictor variables. Equation 1 is known as the cumulative distribution function. In addition, 1 - P(Yi = 1) characterises the probability of being food insecure. Therefore, the probability of being food insecure can be written as:

$$1- P(Y=1) = \frac{1}{1+e^{z_i}} \quad \ldots\ldots 2$$

The odds ratio shows the probability of being food secure to the probability that the household might be food insecure. The odds ratio is expressed as follows:

$$\frac{P(Y=1)}{1-P(Y=1)} = e^{Zi} \quad \text{.....3}$$

L_i in equation 4 signifies the natural logarithm of the odds ratio. This equation represents the logit regression model as shown below.

$$L_i = \ln\frac{P(Y=1)}{1-P(1=1)} = Z_i \quad \text{.....4}$$

Therefore, the model specification that will be estimated in this study is as follows:

$$Zi = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \ldots\ldots + \beta_nX_n + U_i \quad \text{.....5}$$

Where $\beta_0$represents the intercept of the regression model, β_1, β_2, β_3, β_4, ... β_n denotes the coefficients of the model, whilst on the other hand, X characterises the vector of the household characteristics and U_i represents the error term.

4.11. Diagnostic tests

This study employed two major types of diagnostic tests to assess the reliability of the coefficients from the estimated model. These diagnostic tests involve the Hosmer-Lemeshow goodness of fit, and the Wald test statistic. Moreover, the matrix correlation was used as the preliminary diagnostic to assess the presence of the multicollinearity among the independent variables.

4.11.1 Hosmer-Lemeshow test

The goodness of fit of the model can be assessed through the use of different methods, which includes the Pearson Chi-square, Deviance statistics, and Hosmer-Lemeshow test. Among these diagnostic tests, the Hosmer-Lemeshow test is regarded as the most powerful diagnostic test to examine the lack of a model fit, when both categorical and continuous variables are simultaneously modelled (Pulkstenis & Robinson, 2002).

According to Pulkstenis and Robinson (2002), the Pearson and Deviance diagnostic tests fail to exhibit the ‘‘approximate chi-square asymptotic distribution”, specifically when

continuous variables are included. The Hosmer-Lemeshow test is considered as a highly reliable and trusted method of assessing the goodness of the fitted model (Hosmer & Lemshow, 2000).

The Hosmer-Lemeshow test is the same as the chi-square goodness of fit and has an advantage of grouping the observations into equal size. The grouping of these observations is based on deciles of the predicted probabilities. Moreover, there are very low chances to find the grouping of these observations with very low actual and expected values (Bewick *et al.,* 2005).

The Hosmer-Lemeshow test can be expressed mathematically as follows:

$$\hat{C}_g = \sum_{i=1}^{g} \left[\frac{(O_{s,i} - E_{s,i})^2}{E_{s,i}} + \frac{(O_{f,i} - E_{f,i})^2}{E_{f,i}} \right],$$

Where g is known as the number of groups with g-2 degrees of freedom, O$s,_i$ and O$f,_i$ are regarded as observed values, whilst Es,I and Ef,I are considered as expected values, which are generated by the fitted model.

Moreover, according to Nezic *et al.* (2013), the good model should have an insignificant p-value, which has to be more than 5% of the level of significance. The study follows this general truth, meaning that when the p-value of the Hosmer-Lemeshow test is greater than 5% (the level of significant), it will imply that the fitted logit model is correctly specified and the estimated model fits the data accurately.

4.11.2 Wald statistic test

According to Bewick *el al.* (2005) the Wald test statistic is utilised to examine the importance or influence of each predictor variable in the estimated model. The above-mentioned authors further pointed out that the Wald test statistic follows a Chi-square distribution, with 1 degree of freedom, and it is easily computed, even though it has some shortcomings in a small sample size. The Wald test can be expressed in a form of equation as follows:

$$(\beta/SE\ \beta)^2$$

Where β is regarded as the coefficient of the estimated model, SE denotes the standard error of the estimated beta (β). The Wald test statistic has null and alternative hypotheses (Hauk and Donnor, 1977).

The Wald test statistic hypotheses is as follows:

$$H0 : \beta k = \beta k0$$

$$H1 : \beta k \neq \beta k0$$

The null hypotheses (H0) is not accepted when the p-value of the Wald test statistic is below the level of significance; usually, it used to be 5% (Muchabaiwa, 2013). The same researcher also revealed that the p-value of the Wald statistic, which is less than 5%, means that the predictor variable has a significant impact in the fitted model. In addition, the study sought to examine the determinants of food security status among the rural indigent households in the Mbizana local municipality.

Hence, this study employed the Wald test statistic as one of the most important coefficients diagnostic tests, in order to evaluate whether the estimated coefficients can be used to influence the decisions of the policymakers countrywide, particularly in rural based communities to reduce food insecurity as well as the poverty rate.

4.12 Conclusion

This chapter gave a detailed explanation of the methodology employed in the study in order to assess the determinants of food security status among the rural indigent households in the Mbizana local municipality. The study provided a detailed description of the population and the area where the study was conducted. Among other things that were discussed in detail in this chapter include research design, sampling techniques, instrumentation, and data collection, measurement of variables, the model and diagnostic tests used in the study.

CHAPTER 5: RESULTS AND DISCUSSION

5.1 Introduction

Chapter 2 provided a solid theoretical and conceptual background that underpins the current research, while Chapter 3 discussed the determinants of the food security status of the households and this was used as a guideline to choose the relevant predictor variables to be utilised in the current research study. This was followed by Chapter 4, which provided a detailed methodological framework that included the research design, sampling techniques, instruments used, data collection process, logistic regression model and diagnostic tests.

In addition, Chapter 5 now presents the findings of the study. Section 5.2 discusses the demographic characteristics of the sample households in the Isikelo community of Mbizana local municipality. Section 5.3 provides descriptive statistics from cross-tabulation chi-square approach whereas section 5.4 reports about the dietary diversity in the study area and section 5.5 presents the determinants of household food security status of the first logit model.

Moreover, subsection 5.5.1 gives a detailed analysis of the factors that influence the food security status for the first model, while subsection 5.5.2 discusses the diagnostic tests, which include the Hosmer-Lemeshow and Wald test. In addition, section 5.6 shows the estimation of the second logit model. This is followed by subsection 5.6.1, which provides a detailed interpretation of the results, while subsection 5.6.2 discusses the diagnostic tests for the second logit model. Lastly, section 5.7 is the conclusion to the chapter.

5.2 Demographic characteristics of the sample households

As noted in the previous chapter, the study collected a sample from 330 household heads, or their adult representatives, and based on household food insecurity access scale, 62.0% of the households were food insecure, while 38.0% of the households were food secure. In comparison, the dietary diversity scores show that 52% households were food insecure, while 48% was food secure. There is a significant discrepancy between the two measures of food security. However, the study prefers the households' food insecurity access scale since it uses a norm of 30 days. Table 1 portrays the characteristics of the household heads who have participated in the study.

Table: 5.1 Household heads demographic characteristics

Household characteristics	Frequency	Percentage
Gender of household head		
Males	180	54.55%
Females	150	45.45%
Age of the household head		
≤ 35	17	5.15%
36 – 40	41	12.42%
41 – 45	28	8.48%
46 – 50	75	22.73%
51 – 55	16	4.85%
56 – 60	34	10.30%
61 – 64	7	2.12%
65 ≥	112	33.94%
Marital status of household head		
Never married	100	30.30%
Married	186	56.36%
Divorced	05	1.52%
Widowed	39	11.82%
Household head employment status		
Employed	28	8.48%
Self-employed	38	11.52%

Part time	74	22.42%
Unemployed	76	23.03%
Not in labour force	114	34.55%
Education level of household head		
Never went to school	25	7.58%
Primary	138	41.82%
Secondary	127	38.48%
Matric and above	40	12.12%

Source: survey results

The above table indicates that 54.55% of households were headed by males, while 45.45% were headed by females. This indicates that both males and females were well represented in the study. Based on the above statistics, the area was dominated by the household heads who were 65 years and above, since they accounted for 33.94% of the total sample. This was followed by the age group that fell within the 46 to 50 years age group (22.73%). With reference to Table 5.1 above, there were only 5.15% of the household heads that were 35 years old or less who participated in the study.

It was observed that the age group of 36 to 40 were represented by 12.42%, while the age category of 41 to 45 years was represented by 8.48%. Moreover, the age bracket of 51 to 55, 56 to 60, and 61 to 64 years was represented by 4.85%, 10.30%, and 2.12%, respectively. In the same table, 30.30% of the household heads never married, whilst 56.36% were married. Moreover, 1.52% were divorced, whereas 11.82% indicated that their partners had passed away.

In the employment status category, it was noted that 8.48% of the heads were employed full time, which indicates that the most households in the area depend on government social security grants for survival. In addition, 11.52% was self-employed, while 22.42% indicated that they were not full-time employed. Based on the finding depicted in the above table, the

unemployment rate among the household heads was 23.03% while 34.55% were not in the labour force.

These households include those who were 65 years and above, and those who indicated that the doctors declared them unfit to be in the labour force due to some health problems and therefore, qualified for government social security grants. In the case of the current study, there were only two households who revealed that according to their age they were supposed to work like anyone else but due to some health challenges they do not participate in the labour force.

Additionally, there were 112 households who indicated that they were 65 years and above, plus two responses from those who were declared unfit to work. This gave a total of 114 households (35% of the sample) who did not participate in the labour force, and in each month the government provide them with social grants. With regard to the above table, 7.58% of the total sample never attended school, and the area was dominated by the household heads who only attained primary school education, since they constituted 41.82% of the total, followed by those who achieved secondary education and matric plus, which accounted for 38.48% and 12.12%, respectively.

5.3 Descriptive statistics from cross tabulations

Descriptive statistics were utilised in order to examine the relationship of each predictor variable relative to the household food security status in the Isikelo community of the Mbizana local municipality and this also shows how the sample was distributed in the study area. For the purpose of this study, food security is defined as the situation that occurs when all household members have access to sufficient food of the highest quality at all times, which results in A healthy and productive life, while ‘food insecure’ refers to those who frequently failed to acquire adequate food (FAO, 2010).

Moreover, the association of each independent variable and food security status was validated by the use of the chi-square test, where 5% was used as the level of significance. However, in the case where the chi-square approach fails to provide a reasonable outcome, the two-tailed Pearson chi-square test was employed. Lastly, the household food insecurity access scale (HFIAS) was used to perform the cross tabulations due to its reliability and

quality, because it used a norm of 30 days, unlike the dietary diversity scores which used a 24 hour recall, and it did not have the cut-off points in order to conclude about the adequacy of diet.

5.3.1 Gender

In Chapter 3, which discussed the empirical literature review, it was observed that the gender of the household heads significantly predicts the food security status. In this study, the gender was coded as 1, when the household was headed by a male, and 0 otherwise. Table 5.3.1 depicts the relationship between food security and gender of the household heads in the study area. Moreover, the household food insecurity access scale was used to measure the food security status as explained in sub-section 4.9.2 of the preceding chapter.

Table: 5.2 Food security status and household head gender cross tabulation

	Gender	
	Female	Male
Food secure	28.7%	45.6%
Food insecure	71.3%	54.4%
Total	100%	100%

From the above table, food insecurity was widespread in female-headed households (71.3%), and there were few of them found to be food secure (28.7%). In the male category, it was observed that the majority, which constituted 54.4%, failed to continuously acquire sufficient food of the best quality, while 45.6% managed to access adequate food of the greatest quality at all times.

The chi-square test shows that there is a relationship between the food security status and household head gender, since the chi-square calculated (9.92) is greater than (3.84) the critical value. This suggests that the household food security status is dependent on gender. We, therefore, reject the null hypothesis (at 5 percent probability level) which says that there is no difference between food security and gender.

5.3.2 Marital status

The study by Yusuf *et al.* (2015) investigated the impact of farming on food security status among the households residing in Oyo State, Nigeria, and found that married household heads were found to be more food secure compared to single (never married), divorced and widowed households. In the current study, the marital status was coded as 1 for married household heads and 0 otherwise (never married, divorced or widowed).

Table: 5.3 Household head marital status cross tabulation

	Marital status	
	Single	Married
Food secure	15.8%	53.9%
Food insecure	84.2%	46.1%
Total	100%	100%

The results obtained in Table 5.3.2 indicate that the prevalence of food insecurity was widespread among single-headed households, where 84.2% of the aforementioned categories were food insecure, while only 15.8% were found food secure. It is of crucial importance to note that the majority of married household heads, which accounted for 53.9%, managed to frequently access sufficient food of the highest quality, whereas 46.1% of them were food insecure.

The cross-tabulation chi-square results show a relationship between food security and marital status of the household head since the chi-square calculated (49.63) is more than (3.84) the critical chi-square value. Therefore, we conclude that the null hypothesis which says that there is no relationship between marital status and food security is rejected at 5%. The implication of these findings indicates that food security status is positively influenced by the marital status of the household head.

5.3.3 Education status

Oyebanjo *et al.* (2015) examined the prevalence of food insecurity among the rural farming households who live in Ijebu, Nigeria and reported that the household heads who have formal education were more food secure than those who never went to school. The education status was coded as 1, when the head of the household had secondary or matric and above, and coded as 0, if the head of the household had no formal education (denoted as primary education or never went to school.

Table: 5.4 Household head education status cross tabulation

	Education status	
	Primary and never went to school	Secondary and matric +
Food secure	20%	55%
Food insecure	80%	45%
Total	100%	100%

The above table shows that the household heads who never went to school, together with those who had primary education were food insecure (80%), and very few (20%) of them were found to be food secure. It is also observed that the majority of households who attained secondary education, and matric plus, were food secure (55%), while 45% were found to be food insecure.

According to the findings from cross-tabulation chi-square, there is a relationship between the level of education of the household head and food security. The null hypothesis that says there is no difference between the level of education and food security status is rejected at 5% probability level, because the chi-square calculated (42.95) is more than (3.84) the critical chi-square value. We, therefore, conclude that the food security status depends on a certain level of education.

5.3.4 Remittances

Jebran *et al.* (2016) outlined that remittances are regarded as the main source of income in most developing countries, and also contribute positively towards an economic growth. The household remittances took a binary value 1 when household receive remittances, and 0 when they do not.

Table: 5.5 Food security status and household remittances cross tabulation

	Remittances	
	Have remittances	No remittances
Food secure	75.8%	23.4%
Food insecure	24.2%	76.6%
Total	100%	100%

Table 5.3.4 indicates that the highest proportion of food insecurity (76.6%) was found in households who do not have remittances, and only 23.4% of the same category were found to be food secure. The majority of households, which constituted 75.8%, who indicated that they receive remittances from their relatives, managed to frequently have access to quality food, while 24.2% failed to timeously acquire the sufficient food.

The Pearson Chi-Square was used to examine whether the variable has a significant influence on food security or not. The null hypothesis, which states that there is no relationship between the dependent variable and remittances, was statistically significant at less than 1%. This implies that the null hypothesis of no relationship between household remittances and food security status was rejected at 5%. Therefore, the researcher concludes that the food security status is positively influenced household remittances.

5.3.5 Government social grants

According to Grobler (2014), the social security grants are not sufficient to ensure that households have access to food of the best quality at all times. This researcher also pointed out that the dependence on government social grants results in a decrease in food security

and consequently reduces the households' dietary diversity. The coding for this variable was 1, when a household receives social security grants from government, and 0 otherwise.

Table: 5.6 Food security status and household social grants cross tabulation

	Government social grants	
	Have social grants	No social grants
Food secure	18.1%	72.5%
Food insecure	81.9%	27.5%
Total	100%	100%

From the above table, it is indicated that the highest proportion of being food secure was pronounced among the households who are not social grant recipients (72.5%), and only 27.5% of the same category found to be food insecure. In addition, it is crucial to note that the majority (81.9%) of households who receive the government social grants were food insecure, while few (18.1%) of them were able to frequently access food of the best quality. This indicates that the households with social security grants are more likely to be food insecure than those who did not.

The Pearson Chi-Square was used to examine whether the variable has a significant impact on the response outcome variable. In this variable, the Pearson Chi-Square was significant at less than 1% probability level. This implies that the null hypothesis which suggests no relationship between the predictor variable and food security was rejected at 5%. Therefore, we conclude that there is a negative relationship between food security and social security grants.

5.3.6 Household size

The study that was conducted by Alem (2007) examined the factors that influence the household food security status in Ethiopia and reported that the households with a large number of family members experienced food insecurity, compared to those with a small family size. For the purpose of examining the association between the food security status

and household size, this study was coded as 1 when households had five or more family members, and 0 when households had four or fewer family members. But in a logit model, it was used as a continuous variable.

Table: 5.7 Food security status and household size cross tabulation

	Household size	
	≤ 4 household members	≥ 5 household members
Food secure	57.4%	17.4%
Food insecure	42.6%	82.6%
Total	100%	100%

In Table 5.3.6, it is shown that the majority (57.4) of households with less or equal to four family members were food secure, while 42.6% were found food insecure. It is observed that the households with five (5) or more family members, experienced greater food insecurity (82.6%), and only 17.4% of them were found food secure. This indicates that those households with a large family size are more likely to be food insecure than those with fewer members.

In appendix C, the chi-square cross tabulation indicates that there is an influence between food security status and size of the household. The null hypothesis that says there is no relationship between the size of the household and response variable was rejected at 5% probability level, with 1 degree of freedom, since the calculated chi-square value (56.08) is more than (3.84) the critical chi-square. We, therefore, conclude that the food security status depends on the size of the household.

5.3.7 Employment status

Sekhampu (2013), investigated the factors that predict the food security status of the households residing in Kwakwasi Township and found the employment status of the head as one of the most important predictor variables in the study area. This study used a dummy

variable which takes a value of 1 when a household head is employed or self-employed, and 0 for unemployed, part-time employed or not in the labour force at all.

Table: 5.8 Household head employment status cross tabulation

	Employment status	
	Employed or self-employed	Not working
Food secure	80.3%	27.3%
Food insecure	19.7%	72.7%
Total	100%	100%

Table 5.3.7 indicates that the most (80.3%) food secure group was among those who had indicated that they were full time employed or self-employed, whereas some of them (19.7%) were food insecure. This is much better than the household heads who indicated that they were not working, where 72.7% were food insecure, while only 27.3% were food secure. Moreover, this indicates that the household heads who were employed had greater chances of acquiring food of a better quality.

The null hypothesis of no difference between the above-mentioned predictor variable and food security status is rejected at 5% probability level, with 1 degree of freedom, because the chi-square calculated (63.07) is greater than (3.84) the chi-square critical. Based on the above results, we conclude that food security is influenced by the employment status of the household head.

5.3.8 Household head age

The literature review that was presented in Chapter 3 shows that the age of the household head has a significant impact on household food security status. For the purpose of examining the relationship between food security status and household head age, five intervals were created and given a code. The age 35 or less was coded as 0, 36 to 40 equal

to 1, 41 to 45 equal to 2, 46 to 50 equal to 3, and 51 plus was coded as 4. The above-mentioned variable was treated as continuous in a logit model.

Table: 5.9 Food security status and age of the household head cross tabulation

	Age categories				
	≤35	36-40	41-45	46-50	51+
Food secure	5.9%	45.9%	40.6%	56.0%	30.8%
Food insecure	94.1%	54.1%	59.4%	44.0%	69.2%
Total	100%	100%	100%	100%	100%

The findings presented in Table 5.3.8, indicates that the most household heads (94.1%) that were affected by food insecurity is in the age bracket of 35 years or less and this was followed by the age group of 51 years old or more (69.2%), and followed by the age category of 41 to 45 years old (59.4%).

From the results depicted in Appendix C, there is a relationship between the response outcome variable and age of the household head. The null hypothesis of no difference between the above predictor variable and food security is rejected at 5% significant level, with 4 degrees of freedom, since the chi-square calculated (27.60) is greater than (9.49) the critical value. We, therefore, conclude that the food security status is influenced household head age.

5.3.9 Household's income

The household total monthly income has emerged as one of the most important predictor variables that influences the food security status in various empirical research studies as observed in Chapter 3. The same approach of creating intervals, and giving them codes, has been adopted in this variable, where households' income ranges from R1 to R800, R801-R1600, R1601-R3200, and R3201 plus (coded as 0, 1, 2 and 3, respectively). The above intervals were created to assess the relationship between the dependent variable

and household income, but this variable was used as a continuous variable in the estimated logit model.

Table: 5.10 Food security status and income of the household head cross tab.

Household's income categories				
	R1-R800	R801-R1600	R1601-R3200	R3201.00 +
Food secure	2.6%	20.5%	61.2%	78.9%
Food insecure	97.4%	79.5%	38.8%	21.1%
Total	100%	100%	100%	100%

On average, the household income in the Isikelo community was R2 019.15, while R300.00 was the lowest income, and the highest was recorded at almost R10 000.00. The above table shows the relationship between the food security status and household income categories. With reference to Table 5.3.9, the highest proportion of food insecurity was found among the households whose income falls in R1 to R800 category (97.4%). Moreover, in the above table, it is indicated that the household whose income bracket fall in R3201 plus were food secure (78.9%). The findings presented above show that as income increases the food insecurity decreases.

The chi-square cross tabulation in appendix C shows a significant impact on the response variable and household income. The null hypothesis which states that there is no relationship between food security status and the above-mentioned predictor variable was rejected at 5% probability level with 4 degrees of freedom, because the calculated chi-square (90.35) is far greater than (7.81) the critical chi-square value. Therefore, we conclude that food security is positively influenced by household income.

5.3.10 Subsistence farming (own food production)

Subsistence farming, particularly in the Sub-Saharan African region, still dominates as a major livelihood strategy which reduces prices and food deficit. This increases food availability and consequently leads to a rise in the food security status of the households

(Baiphethi & Jacobs, 2009). The above-mentioned variable is measured as a dummy which takes 1 when households produce some food for their own consumption, and 0 otherwise.

Table: 5.11 Food security and subsistence farming cross tabulation

	Own food production (subsistence farming)	
	Practice farming	Do not farm
Food secure	39.0%	37.0%
Food insecure	61.0%	63.0%
Total	100%	100%

It is important to observe that the most households (61.0%) who practise farming for their own consumption were food insecure, whereas only 39.0% of them was food secure. This is an indication that subsistence farming does not have much influence on household food security status. Moreover, Table 5.11 also shows that the majority (63.0%) of the households who do not engage in farming for their own use were food insecure, while 37.0% were food secure.

The cross-tabulation chi-square shows that there is no relationship between own food production (subsistence farming) and food security status. This implies that the null hypothesis which says that there is no difference between the food security status and subsistence farming was accepted at 5% probability level with 1 degree of freedom, since the calculated chi-square (0.13) is smaller than (3.84) the critical chi-square value. Therefore, we conclude that the food security status is not affected by subsistence farming (own food production).

5.3.11 Membership in farm cooperative

Ifeoma and Agwu (2014) investigated the factors which determine the food security status of the rural households in Nigeria and found that the membership in farm cooperative reduces the food insecurity. The membership in farming cooperative was measured as a dummy which takes 1 for households who have membership, and 0 otherwise.

Table: 5.12 Household membership in a cooperative cross tabulation

	Membership in farm cooperative	
	Have a membership	Do not have a member
Food secure	57.7%	34.2%
Food insecure	42.3%	65.8%
Total	100%	100%

From the above table, the majority (65.8%) of the households without a membership in farming cooperative were food insecure and 34.2% of those who did not have membership in farming cooperatives were food secure. The results depicted in Table 5.3.11, reveal that 57.7% of the households with membership in farming cooperative were food secure while 42.3% in the same group were food insecure.

According to the results from chi-square test, there is a relationship between membership in farming cooperative and food security status. The null hypothesis of no difference between the outcome variable and being a member of the farming cooperative was rejected at 5% probability with 1 degree of freedom, since the calculated chi-square (10.30) is greater than (3.84) the critical value. Based on these findings, we conclude that the food security status is influenced by being a member of the farming cooperative.

5.3.12 Land restitution programme

In the Isikelo community, households were affected by their forced removal during the apartheid regime and thus received compensation from the government in the form of cash, as outlined in the land restitution programme. Therefore, those who benefited from the programme were denoted as follows: coded as 1 where households received a compensation in a form of cash, and 0 otherwise.

Table 5.13 Food security status and land restitution programme cross tabulation

	Land restitution programme	
	Cash from the programme	No benefit from the programme
Food secure	14.3%	38.9%
Food insecure	85.7%	61.1%
Total	100%	100%

Table 5.13 shows that 85.7% of the households who have indicated that they received money as compensation from the land restitution programme were food insecure, while only 14.3% of the same group were found food secure. According to the findings from discussions during interviews, some of the respondents indicated that the estimated amount of the money from the above-mentioned programme ranged from R17 000.00 to R18 000.00, but, there were extreme cases were some households received R30 000.00 or more. The majority of them posited that they used that money to build or renovate their houses and bought some furnishing and other household good.

In addition, this is an indication that the majority did not devote a large portion of that money to purchase food. This might be one of the reasons why the majority from the above-mentioned category was food insecure. Moreover, 61.1% of those who benefited from the programme were food insecure, Valente (2009) examined the household food security status in South Africa and his findings revealed that the households who received land grants were most vulnerable to food insecurity, while none of the recipients of land grants were found to be food secure. One of the reasons for this might due to the failure of households to invest the money in a form of fixed deposits so that after sometime can claim the interest. Alternatively, those who claimed land might fail to use it effectively as a result they cannot produce anything from it.

The chi-square cross tabulation in appendix C shows that there is no significant impact on the food security and land restitution programme in the study area. The null hypothesis which states that there is no relationship between food security status and the above-

mentioned predictor variable was not rejected, because the calculated chi-square (3.46) is less than (3.84) the critical value. We, therefore, conclude that food security is not influenced by land restitution programme.

5.3.13 Farm income (only crops)

The relationship between household food security and farm income is depicted below in Table 5.14. Farm income was measured as a dummy taking a value of 1, where households have income generated from agriculture, and 0 otherwise. In the measurement of this variable, we only considered the income that was generated from crops like maize as the most planted crop in the area.

Table 5.14 Food security status and farm income cross tabulation

	Farm income	
	Have farm income	Do not have farm income
Food secure	25.0%	38.0%
Food insecure	75.0%	62.0%
Total	100%	100%

The above table shows that the majority (75.0%) of households who indicated that they sell some of the products they produce were food insecure, while few (25.0%) of them managed to access adequate food at all time. It is also observed that the prevalence of food insecurity was higher (62.0%) among the households who do not sell anything from what they produce from their farms, whereas some of them (38.0%) were food secure.

The cross-tabulation chi-square test shows that there is no relationship between food security status and household farm income since the chi-square calculated (0.29) is lower than (3.84) the critical value. This implies that the null hypothesis of no relationship between farm income and food security status is accepted at 5% probability level with 1 degree of freedom. Therefore, we conclude that the food security status is not influenced by farm income.

5.3.14 Livestock ownership

In the empirical research, it is indicated that households who own livestock are more likely to be food secure than those who did not. In the case of the current study, this variable was measured as a dummy variable which takes a value of 1 for those who own the livestock like goats, sheep and cattle. Therefore, any household that has one of the above-mentioned livestock were given a value of 1 (coded as 1), and 0 otherwise. Table 5.15 depict, the relationship between livestock ownership and food security status of the households in the study area.

Table 5.15 Food security status and livestock ownership cross tabulation

	Livestock ownership	
	Have livestock	Do not have livestock
Food secure	46.7%	31.8%
Food insecure	53.3%	68.2%
Total	100%	100%

With reference to Table 5.15, the majority (68.2%) of households among those who did not own livestock failed to frequently access sufficient food (food insecure), while only some of them (31.8%) were food secure. Moreover, the above analysis indicates that 53.3% of households who are in possession of livestock, were food insecure, and 46.7% of the same category were food secure, which is much better than those who do not have livestock. Kariuki *et al.* (2013) found a positive relationship between food security and livestock ownership.

In appendix C, the cross-tabulation chi-square shows that there is a relationship between food security status and livestock ownership because the chi-square calculated (7.50) is more than (3.84) the critical value. This implies that the null hypothesis of no relationship between the household food security and livestock ownership is rejected at 5%. We, therefore, conclude that the food security status is influenced by livestock ownership.

5.3.15 Improved seed

Kahsay and Mulugete (2014) posited that the use of improved seeds leads to an increase in food availability which also increases the food security status of the households. The above-mentioned variable was measured as a dummy which takes 1 when households use improved seeds, and 0 otherwise.

Table 5.16 Food security status and use of improved seed cross tabulation

	Improved seed	
	Use improved seed	Do not use improved seed
Food secure	42.7%	35.2%
Food insecure	57.3%	64.8%
Total	100%	100%

Table 5.16 shows a cross tabulation between household food security and use of improved seed. The highest proportion of food insecurity (64.8%) was found among the households who did not use the improved seed, and 35.2% of the same group were food secure. Additionally, 42.7% of those who have indicated that they use improved seed were food secure, while 57.3% were food insecure.

The cross-tabulation chi-square shows that there is no relationship between food security status and use of improved seed, since the chi-square calculated (1.82) is less than (3.84) the critical value. This indicates that the null hypothesis of no relationship between food security status and use of improved seed is accepted at 5% probability level and we conclude that the food security is not dependent on the use of improved seed.

5.4 Dietary diversity score

Kennedy *et al.* (2013) outlined that there are no official cut-off points used, based on the number of food groups consumed by either household members or individuals in order to draw an accurate conclusion about the adequacy of dietary diversity. Mbwana *et al.* (2016)

and Taruvinga *et al.* (2013) followed Ruel (2003), who created three strata which were based on low, medium and high dietary diversity. In this approach, the dietary diversity scores were calculated based on twelve food groups. The minimum score was zero and the maximum was 12. The low diversity was denoted by a score of 0 to 3 points, medium 4 to 6 and high diversity was indicated by 7 to 12 points. However, in the questionnaire of the current study some food groups were combined and given one point as explained in section 4.8 of Chapter 4.

Table: 5.17 Categories of dietary diversity

	Low DD	**Medium DD**	**High DD**
Dietary diversity score	0 – 3	4 – 6	7 – 12
No. of respondents	110 (33.33%)	136 (41.21%)	84 (25.45%)

Table 5.17 shows that 33.33% fell in low dietary diversity while 41.21%, and 25.45% of the total sample were in a medium and high dietary diversity category, respectively. The implication of the above findings suggests that 33.33% of the households had low nutritional security while 25.45% were nutritionally secure.

Table: 5.18 The consumption pattern in the study area

Food groups	**Example**	**%**		**Food groups**	**Example**	**%**
Cereals	Maize meal	78.79		White roots & tubers	Potatoes	24
	Rice	58.79		Other vegetables	Tomato	20.91
					Onion	50.0
Flesh meet	Chicken	49.0		Vitamin A rich veg. and tubers	Carrots	22.12
	Beef	27.0			Pumpkin	11.52
	Pork	0.61				
	Lamb	2.73		Vitamin A rich fruits	Mango	9.09
	Goat	1.21			100 Juice	2.12
Organ meat	Liver	21.0		Dark green leafy veg.	Spinach	6.67
Eggs	Any egg	28.0				
Legumes, nuts and seeds	Dried beans	24.0		Fish and seafood	Shellfish	3.94
	Nuts	0.91				

				Spices/condiments	Spice	23.0
Milk and milk products	Milk	32.0			Salt	25.76
	Yogurt	0.91			Sugar	29.70
Oil and fats	Oil/fats	44.55				

Source: survey results

The above table shows the consumption of each food from different categories. The data indicate that the majority of households in the Isikelo community consumed starchy foods, since the consumption of the maize meal was 78.79%, followed by rice intake, which was 58.79%. Moreover, 24% of the households indicated that they ate potatoes. These staple food are rich in minerals, vitamins and fibre. Michaelsen *et al.* (2009), starchy foods have low minerals, macro, and micro-nutrients, which cause a number of health-related problems, such as growth, development and cause a body to be easily affected by infectious diseases.

In the same table, it was observed that the chicken consumption was 49%, followed by the beef intake which was 27%. In addition, the lamb consumption was 2.73% while the goat and pork intake were 1.21% and 0.61%, respectively. The use of milk was 32%, while eggs' intake was 28%. The utilisation of beans, liver, nuts, and fish was 24%, 21%, 0.91%, and 3.94%, respectively. Moreover, 22.12% of the households consumed carrots.

In addition, fruits consumption was less than 10% and it was also observed that the pumpkin consumption was 11.52% while dark green leafy vegetables' (i.e. spinach) intake were only 6.67%. Hence, this is an indication that the households consume the kind of food that contains a lot of vitamin A.

The empirical work shows that the lack of vegetable and fruit intake increases the risk of being exposed to various infectious diseases (Boeing *et al.,* 2012). Lastly, oil and fats'

utilisation was 44.55%, while spices, salt, and sugar utilisation was 23%, 25.76%, and 29.70%, respectively.

5.5 The determinants of food security status of the first binary logit model

This study used two approaches to measure the dependent variable as mentioned in Chapter 4. In the first binary logit model (Table 5.4), the response outcome variable was measured using the dietary diversity scores, as it was explained in detail in the preceding chapter. In addition, the twelve (12) food groups were utilised to calculate the dietary diversity scores. The households who scored 6 points or more were deemed food secure (coded as 1), while those who had five (5) points or less were regarded as food insecure and coded as 0. Table 5.4. shows the determinants of food security status of the sample households in the Isikelo community of the Mbizana local municipality.

Table: 5.19 The determinants of food security status of the sample households

Food security (using dietary diversity scores)	Coef.	Odds ratios	Std. Err.	z	P>z
Hhs – household size	-0.003	0.9974	0.0729	-0.04	0.971
Hhsg – household social grants	-1.054	0.3485	0.4011	-2.63	0.009*
Hhhag – household head age	0.007	1.0067	0.0145	0.46	0.643
Hhhg – household head gender	0.579	1.7847	0.2935	1.97	0.048**
Hhhm – household head marital status	0.095	1.0998	0.3013	0.32	0.752
Hhhed – household head education status	0.282	1.3256	0.2898	0.97	0.331
Hhinc – household monthly income	0.001	1.0007	0.0002	3.62	0.000*
Lr – land restitution	0.512	1.6680	0.7176	0.71	0.476
Rem – household remittances	0.946	2.5741	0.3388	2.79	0.005*
Hhhemp – employment status (head)	0.057	1.0584	0.4162	0.14	0.892
Livst – livestock ownership	0.082	1.0850	0.3897	0.21	0.834
Impro seed – improved seeds	-0.217	0.8050	0.5523	-0.39	0.695
Mcoop – cooperative membership	1.309	3.7006	0.4635	2.82	0.005*
Sfarming – subsistence farming	-0.040	0.9604	0.5750	-0.07	0.944
_cons	-2.004	0.1347	0.7846	-2.55	0.011

*, **, *** Significant at 1%, 5%, and 10%, respectively

5.5.1 Discussion of results for the first logit model

The social grant coefficient is negative and significant at less than 1%. The loose interpretation of this coefficient suggests that a unit increase in security grants decreases the probability in favour of food security by 1.05 units. According to Gujarati (2004), the above interpretation is not recommended to be used in a logit model. Hence, he suggested that one should use the odd ratios as an appropriate alternative. In addition, Gujarati and Porter (2009) asserted that after the estimation of the logit model, we have to subtract 1

from each of the odds ratios that we obtained in the model, and multiply that by 100, in order to interpret the findings using the percentages.

Moreover, holding other factors constant when the social grants rise by 1, the odds in favour of being food secure decreases by 0.35. Alternatively, a unit increase in social grants decreases the probability of being food secure by 65%. This can also be interpreted as households receive social grants are 0.65 times less likely to be food secure.The most interesting part about this finding is in line with the findings that were presented in the cross-tabulations above. This indicates that the households who received social grants were more food insecure and less likely to diversify their diet than those who did not. Altman *et al.* (2009) outlined that an increase in the number of households who receive the social grants cause chronic hunger to rise and hence malnutrition is considered to be a widespread challenge. This might occur because of reliance on social security grants, than supplementing this by other sources of income.

The coefficient of gender is positively associated with food security and statistically significant at less than 10%. In this study, the female-headed households are treated as a reference category. The findings obtained from the model show that when the household is headed by a male, it increases the odds in favour of being food secure by 1.78. Therefore, when male-headed households rise by 1, it increases the probability in favour of being food secure by 78% relative to the female counterparts.

This is also supported by the descriptive statistics which indicated that most female-headed households were unable to frequently access the food of the best quality. These results are consistent with Zakari *et al.* (2014), who found a positive and significant impact on food security status and household head gender. In addition, these researchers posited that female-headed households were more food insecure compared to male headed households in Southern Niger of West Africa where their study was conducted.

The household total monthly income is statistically significant at less than 1% and positively associated with food security status. When all other factors are held constant, the odds ratio (*Exp(β)*) suggests that the households whose income rise by 1 unit (i.e. R1 rand) increases the odds in favour of being food secure by 1.0007. Hence, a R100 rise in household income

increases the probability of being food secure by 0.07%. This also indicates that those with a high monthly income are more likely to diversify their diet than their counterparts. The findings of the current study concur with Ndobo (2013), who found a positive relationship between the food security status and household income. Moreover, Ndobo posited that an increase in household income leads to an increase in food production and consequently result in an increase in food accessibility.

The household remittances are statistically significant at less than 1% and positively correlated to food security status. All things being equal, a unit increases in remittances, which increase the odds in favour of being food secure by 2.57. Alternatively, this indicates that when remittances increase by 1, it leads to an increase in the probability of being food secure by 157%. Moreover, this shows that the recipients of remittances are more likely to diversify their diet than those who did not receive help. In addition, these findings indicate that an increase in household remittances leads to a rise in food security status. Regmi *et al.* (2016) found that a unit increase in annual remittances increases the probability for the households to have more food to consume.

The membership in farm cooperative is positively associated with food security and statistically significant at less than 1%. Holding other factors constant, when membership in maize cooperative increases by 1 in the Isikelo community, it increases the odds in favour of being food secure by 3.70. Additionally, these findings suggest that when membership in maize projects (cooperative) in the said community rises by 1, it results in an increase in the probability of being food secure by 270%. Hence, this indicates that those who participate in the maize cooperative of the above-mentioned area have greater chances of diversifying their diet than non-participants. Chepng'etich *et al.* (2015) used a logistic regression and found a positive relationship between sorghum production and household membership in farm association.

5.5.2 Diagnostic tests for the first binary logit model

There are many ways of evaluating the goodness of fit which include the sum of squares, deviance, Pearson Chi-square statistic and Hosmer-Lemeshow test, but among these methods of assessing the goodness of fit in the model, the Hosmer-Lemeshow test is

commonly used as the measure of the lack of model fit (Zhang, 2016). Table 5.5. depicts the Hosmer-Lemeshow test of the first logit model

Table: 5.20 Hosmer-Lemeshow test

	Quantile of Risk		Dep=0		Dep=1		Total	H-L
	Low	High	Actual	Expect	Actual	Expect	Obs	Value
1	0.0727	0.1500	30	29.1157	3	3.88434	33	0.22819
2	0.1561	0.1881	29	27.2321	4	5.76794	33	0.65667
3	0.1885	0.2482	28	26.0240	5	6.97604	33	0.70978
4	0.2482	0.3149	22	23.6252	11	9.37484	33	0.39352
5	0.3181	0.4039	21	21.3654	12	11.6346	33	0.01773
6	0.4056	0.5727	15	16.7496	18	16.2504	33	0.37111
7	0.5757	0.6533	12	12.7584	21	20.2416	33	0.07350
8	0.6552	0.7786	9	9.45235	24	23.5476	33	0.03034
9	0.7828	0.9109	4	5.34678	29	27.6532	33	0.40483
10	0.9153	0.9987	3	1.33060	30	31.6694	33	2.18248
		Total	173	173.000	157	157.000	330	5.06815

H-L Statistic	5.0681	Prob. Chi-Sq(8)	0.7503
Andrews Statistic	7.8772	Prob. Chi-Sq(10)	0.6408

Source: Eviews output

The Hosmer-Lemeshow test has a chi-square of 5.07 with a p-value of 0.75. This indicates that the statistical data fit the model accurately and therefore we have a good model. This is an indication that the model was correctly implemented according to specification. Secondly, the null hypothesis, which says that all coefficients in the fitted model are jointly equal to zero, was examined through the use of Wald test statistic as shown in Table 5.6. below.

In the Wald test of the current study, the F-statistic is significant at less than 1% and therefore the above-mentioned null hypothesis is rejected. We conclude that some variables

have a significant impact on household food security status in the Isikelo community of the Mbizana local municipality.

Table: 5.21 Wald test for the first logit model

Test statistic	**Value**	**df**	**Probability**
F-statistic	**5.089656**	**(14,315)**	**0.0000**
Chi-square	**71.25519**	**14**	**0.0000**
Null hypothesis: c(2) = c(3) = c(4) = c(5) = c(6) = c(7) = c(8) = c(9) = c(10) = c(11) = c(12) = c(13) = c(14) = c(15) = 0			
Normalized restriction (=0)		Value	Std. Err.
C(2)		-0.002612	0.072894
C(3)		-1.054171	0.401104
C(4)		0.006700	0.014469
C(5)		0.579237	0.293489
C(6)		0.095159	0.301295
C(7)		0.281873	0.289822
C(8)		0.000688	0.000190
C(9)		0.511628	0.717601
C(10)		0.945515	0.338796
C(11)		0.056747	0.416201
C(12)		0.081615	0.389654
C(13)		-0.216897	0.552265
C(14)		1.308495	0.463550
C(15)		-0.040428	0.575007

Source: E-views output

In the Wald test of the current study, the F-statistic is significant at less than 1% and therefore the above-mentioned null hypothesis is rejected. We conclude that some variables

have a significant impact on household food security status in the Isikelo community of the Mbizana local municipality.

5.6 The determinants of household food security status for the second logit model

As noted in Chapter 4, the logit model is used when the dependent variable has two and unobserved dichotomous categories. In this study, the dependent variable has a binary value which takes a value of 1 when a household is food secure and 0 otherwise. The response variable of the second model was measured through the household food insecurity access scale (HFIAS) as explained in chapter four. Moreover, Table 5.6. portrayed the determinants of household food security in the Isikelo community of Mbizana local municipality.

Table 5.22 Determinants of household food security status[1]

Food security (using HFIAS)	Coef.	Odds Ratios	Std. Err.	Z	P>z
Hhs – household size	-0.972	0.379	0.078	-4.71	0.000*
Hhsg – social grants	-2.311	0.099	0.086	-2.65	0.008*
Hhhag – household head age	0.049	1.050	0.033	1.57	0.116
Hhhg – gender	0.936	2.551	1.311	1.82	0.068***
Hhhm – marital status	1.684	5.388	2.840	3.20	0.001*
Hhhed – education status	0.315	1.369	0.662	0.65	0.515
Hhinc – household income	0.003	1.003	0.001	5.80	0.000*
Farminc – farm income	3.792	44.433	74.919	2.24	0.025**
Lr – land restitution	-1.611	0.1997	0.294	-1.09	0.275
Rem – remittances	2.933	18.786	10.796	5.10	0.000*
Hhhemp – employment status	-0.608	0.544	0.361	-0.92	0.359
Livest – livestock ownership	1.014	2.756	1.948	1.43	0.152
Impr_seed – improved seeds	2.097	8.143	8.723	1.96	0.050**
Mcooper – cooperative membership	-0.078	0.925	0.794	-0.09	0.928
Sfarming – subsistence farming	-2.294	0.101	0.118	-1.97	0.049**
_cons	-5.421	0.004	0.007	-3.26	0.001

***, **, *** Significant at 1%, 5%, and 10%, respectively.**

[1] Note that the pests and diseases variable was excluded from the model for it was providing implausible results.

The reported model is the final one that was settled upon.

5.6.1 Discussion of results for the second logit model

The household size is negatively associated with food security status and statistically significant at less than 1% probability level. This can be roughly interpreted as the size of the household rises by 1 person, the probability in favour of being food secure decreases by 0.97 units. According to Gujarati (2004), the above interpretation is just a loose explanation and he emphasised that the most appealing way of interpreting the logit results is when one uses the odds ratio.

Holding other factors constant, when the household size increases by 1 person, it decreases the odds in favour of being food secure by 0.38. Hence, this indicates that a unit increase in household size leads to a decrease in the probability of being food secure by 62%. The findings of the current study concur with Tefera and Tefera (2014), who examined the determinants of household food security status and coping strategies to food insecurity in Ethiopia.

These researchers found a negative and significant impact on food security status and household size. Aidoo *et al.* (2013) pointed out that the situation could be attributed to the fact that as the size of the household increases by 1 member, the food consumption rises, whereas in contrast, food expenditure and income per head falls.

The coefficient of the social grant is negative and significant at less than 5%. The loose interpretation of this coefficient suggests that a unit increase in security grants result in a decrease in the probability of the households being food secure by 2.31 units. This indicates that the recipients of social security grants are less likely to be food secure than those who did not receive any grant from the government.

In addition, the meaningful analysis shows that when the additional household receives the social security grants, it decreases the odds in favour of being food secure by 0.09. Therefore, this suggests that when social grants increase by 1 it results in a decrease in the probability in favour of being food secure by 91%. This was supported by Grobler (2014) who emphasised that the social grants are not sufficient to ensure that households have sustained access to food of the highest quality at all time.

The coefficient of gender is positively associated with food security and statistically significant at less than 10%. In this study, the female-headed households are treated as a reference category. The findings obtained from the model shows that when the household is headed by male it increases the odds in favour of being food secure by 2.55. Therefore, when male-headed households rise by 1 it increases the probability in favour of being food secure by 155% relative to the female counterparts. It was also observed that the findings of the logit model are in line with the results from cross tabulations where female-headed households were found more food insecure than male-headed households. This finding is consistent with Edeh and Gyimah-Brempong (2015), who found male-headed households more food secure than female counterparts.

Marital status is statistically significant at less than 1% and positively related to food security status. Assuming that all other factors are held constant, the findings indicate that when the household is headed by a married person, it increases the odds in favour of being food secure by 5.39. This is an indication that when the additional household members get married, the probability in favour of being food secure increases by 439%. This was also supported by the findings from Table 5.3.2 of the cross tabulations which shows that married household heads are more likely to be food secure than single head-households. One of the reasons for married household heads to be food secure is because they combine the income with their partners, which grants them better access to sufficient food of the best quality. Adepoju and Adejare (2013) found a positive correlation between the influence of food security and marital status.

The household total monthly income is statistically significant at less than 1% and positively associated with food security status. Assuming that other factors are held constant, a unit increase in household income (i.e. R1) increases the odds in favour of being food secure by 1.003. Moreover, a R100 increase in household income results in an increase in the probability in favour of being food secure by 0.3%. The results of the current study concur with Musemwa *et al.* (2013), who have found a positive correlation between food security and household income, which revealed that as monthly incomes rise, the households were more likely to be food secure in the study area.

The coefficient of farm income is positively associated with food security and statistically significant at less than 5%. Holding other factors constant, a unit increase in farm income increases the odds in favour of being food secure by 44.43. This shows that the households who produces and sells some crops have greater chances of being food secure, since that would have a positive impact on total household monthly income. In contrast, the study found contradictory results regarding farm income. According to Table 5.3.14 from the cross-tabulations, farm income does not have a contribution to reduce the household food insecurity; maybe one of the reasons for this is because farming is seasonal. Therefore, the households sell some crops after the harvest, and thereafter sell nothing, which reduces their total monthly income and makes them fall short in access to the food of the highest quality at all times. Ibok *et al.* (2014) posited that an increase in farm income increases the chances for the households to be more food secure.

The household remittances are statistically significant at less than 1% and positively correlated with the food security status. Holding other things equal, a unit increase in remittances increases the odds in favour of being food secure by 18.79. This shows that the recipients of remittances are more likely to be food secure, compared to those who received nothing from their relatives. In addition, these findings also indicate that an increase in remittances have a positive impact on household food security status. This finding is consistent with Nyikahadzoi *et al.* (2013), who found that a unit change in remittances results in a decrease in household food insecurity.

The coefficient of improved seeds has positive influence on household food security status and it is significant at less than 5%. When all other factors are held constant, a unit increase in improved seeds increases the odds in favour of being food secure by 8.14. This indicates that those who used improved seeds were much better in terms of being food secure relative to those who did not. With reference to Table 5.3.16 from cross-tabulations, 65% of the households who did not use the improved seeds were food insecure, while 57% of those who used it were found food insecure.

One of the reasons for the majority of households who used improved seeds to be food insecure might be the lack of extension services. Hence, this could equip rural farmers with relevant skills and have better understanding of how and when to plough. Thus, the

provision of such services might increase the crops' harvest and consequently increases the household's food security. Abdulla (2015) found a positive association between food security and improved seed, and asserted that when the use of improved seeds rises it also increases the food security status.

The subsistence farming (own food production) was statistically significant at less than 5% and was negatively associated with food security status. Keeping other factors the same, when subsistence farming rises by 1, it decreases the odds in favour of being food secure by 0.10. Alternatively, this shows that a unit increase in subsistence farming decreases the probability in favour of being food secure by 90%. In addition, this indicates that subsistence farming does not have a significant contribution to uplift the households from poverty and food insecurity. This finding is also supported by the cross tabulation depicted in Table 5.3.10. Therefore, the households who engage in own food production are almost the same as others who did not.

The findings of the current study are not in correspondence with Ngongi and Urassa (2015), who found a positive influence between the food security status and own food production. However, in the case of the current study, one of the reasons why the subsistence farming has a negative contribution to food security might be due to other factors such as a low harvest and most of the households do not participate in maize projects (cooperative) due to the fact that they do not afford to pay for the improved seeds and fertiliser etc.

The second reason might be the lack of extension services where farmers would get an informal education and understand farming much better. In the current study, the sampled households have indicated that they do not have access to extension services. According to Abur (2014), the extension services play an important role in households' food security status. These researchers outlined that such services equip farmers with relevant skills which increases crop production and hence improves the food security status of the households. Based on the findings of the above-mentioned researchers, this might be one of the factors that contribute to low production among the households in the study.

The third reason why subsistence farming does not contribute much in household food security might be a lack of financial support either from government or the NGOs and based

on the findings of the present study, all of the participants have indicated that they do not receive any cash from the government or NGOs to support their farming activities. According to Baloyi (2010), one of the major constraints faced by the small-scale farmers is the lack of access to finance which could assist them to purchase the farming production inputs. The financial support to small farmers is important, because it avoids the low production which causes food insecurity in most rural areas (Masuku, 2013). Moreover, the lack of financial support towards the small-scale farming in rural areas could result in low crops harvest which reduces the food availability and also increases the food insecurity status as noted above.

5.6.2 Diagnostic tests for the second logit model

This study employed the Hosmer-Lemeshow test to examine the accuracy of data in the fitted binary logit model and Wald test statistic, which examines the joint significance of the coefficients in the estimated model. In addition, the correlation matrix was used to assess the presence of multicollinearity among the independent variables that were included in the model.

5.6.2.1 Hosmer-Lemeshow test

The Hosmer-Lemeshow test results obtained from the binary logit model has a chi-square value of 5.91 with a p-value of 0.66. This indicates that the Hosmer-Lemeshow test was statistically insignificant, which revealed that the estimated model fits the data accurately. Moreover, this is an indication that there is no misspecification in the fitted logit model.

Table: 5.23 Hosmer-Lemeshow test

	Quantile of Risk		Dep=0		Dep=1		Total	H-L
	Low	High	Actual	Expect	Actual	Expect	Obs	Value
1	5.E-07	0.0010	33	32.9868	0	0.01318	33	0.01318
2	0.0011	0.0047	33	32.9149	0	0.08507	33	0.08529
3	0.0050	0.0165	33	32.6514	0	0.34857	33	0.35229
4	0.0172	0.0472	32	31.9996	1	1.00039	33	1.5E-07
5	0.0487	0.1136	33	30.4707	0	2.52934	33	2.73929
6	0.1165	0.3628	23	26.1592	10	6.84080	33	1.84051
7	0.3768	0.7679	13	13.8867	20	19.1133	33	0.09776
8	0.7948	0.9694	4	3.43629	29	29.5637	33	0.10322
9	0.9735	0.9955	1	0.45959	32	32.5404	33	0.64442
10	0.9956	1.0000	0	0.03474	33	32.9653	33	0.03478
		Total	205	205.000	125	125.000	330	5.91074

H-L Statistic	5.9107	Prob. Chi-Sq(8)	0.6572
Andrews Statistic	119.337	Prob. Chi-Sq(10)	0.0000

Source: E-views output

5.6.2.2 Wald test

The Wald test statistic portrayed in table 5.7 shows that the F-statistic (0.000) and chi-square value (0.000) are statistically significant at less than 1% probability level. This suggests that the null hypothesis, which says that the coefficients of the estimated logit model are jointly equal to zero, is rejected.

Table: 5.24 Wald test for the second logit model

Test statistic	**Value**	**df**	**Probability**
F-statistic	**4.456915**	**(15,314)**	**0.0000**
Chi-square	**66.85373**	**15**	**0.0000**
Null hypothesis: c(2)=0, c(3)=0, c(4)=0, c(5)=0, c(6)=0, c(7)=0, c(8)=0, c(9)=0, c(10)=0, c(11)=0, c(12)=0, c(13)=0, c(14)=0, c(15)=0, c(16)=0			
Normalized restriction (=0)	Value	Std. Err.	
C(2)	-0.971553	0.206333	
C(3)	-2.311076	0.871775	
C(4)	0.048932	0.031133	
C(5)	0.936358	0.513972	
C(6)	1.684228	0.527077	
C(7)	0.314471	0.483553	
C(8)	0.002867	0.000494	
C(9)	3.791958	1.689534	
C(10)	-1.610840	1.474278	
C(11)	2.933102	0.574695	
C(12)	-0.608084	0.663273	
C(13)	1.013850	0.706908	
C(14)	2.097199	1.071170	
C(15)	-0.077799	0.857748	
C(16)	-2.293747	1.164237	

Source: E-views output

In the first logit model, 14 variables were fitted and it was observed that 5 of them were statistically significant. These variables include social grants (-), gender (+), monthly income (+), remittances (+), and farm cooperative membership (+). Moreover, the farm income variable was excluded in the first model due to week variation and the lack of association between household dietary diversity and farm income. With regard to the model fit, the Hosmer-Lemeshow test shows that the model was good and free from misspecification. In addition, the Wald test has a significant F-statistic and reveals that the null hypothesis stating that all coefficients in the model are equal to zero was rejected.

The second model indicates that 09 of the 15 commonly used predictor variables that were included in a logit model were found to statistically significant. These variables included household size (-), government social grants (-), gender (+), marital status, total household monthly income (+), farm income (-), remittances (+), improved seed, and subsistence farming (own food production) (-). In addition, the Hosmer-Lemeshow test indicates that the data fit the model accurately and also shows that there was no misspecification bias. Lastly, the Wald test shows that the estimated coefficients of the logit model were not jointly equal to zero. Therefore, the null hypotheses were rejected at 5 percent probability level.

5.7 Conclusion

This chapter presented the findings of the study that were obtained from descriptive statistics and logit regression models. The intention to undertake the logit model and descriptive statistics was to find the association between the independent variables and food security status of the indigent households in the Isikelo community of the Mbizana local municipality.

Moreover, the descriptive statistics shows that 62.0% of the sampled households were food insecure, whereas 38.0% of them were found food secure. The dietary diversity scores show that 33.33% were in low diversity category while 41.21% and 25.45% fell in medium and high dietary diversity group, respectively. The most households in the study area consumed starchy foods. Moreover, it was also noted that the households consumed less foods that contain vitamin A (e.g. carrot) and vitamin C such as pumpkin and spinach.

CHAPTER 6: CONCLUSION AND RECOMMENDATIONS

6.1 Introduction

The first chapter in this study introduced the dissertation, while the second chapter provided a solid theoretical and conceptual framework. Chapter 3 discussed the determinants of food security status and this was used as a guideline to select the relevant independent variables that were used in the current research study. This was followed by Chapter 4 which provided a detailed methodological framework that included the research design, the sampling techniques, the instruments used, the data collection process, the logistic regression model and the diagnostic tests. In addition, Chapter 5 presented the findings of the study, and Chapter six concludes and give recommendations based on the results presented in the preceding chapter.

6.2 Summary of the study

The main aim of this research study sought to examine the determinants of households' food security status focusing on rural areas of the Mbizana local municipality. The literature has indicated that even though South Africa is food secure at the national level, the households who live in rural areas are still suffering from severe food insecurity.

The first objective of the study sought to examine the dietary diversity pattern in the Isikelo community while the second objective assessed the determinants of food security status of the rural indigent households in the Mbizana local municipality, where permission was granted to conduct the investigation. It was observed that there is no such study that was conducted in the Alfred Nzo district, where the Mbizana local municipality is located.

Hence, this allowed for a detailed analysis of the determinants of households' food security status, which is considered to be a priority among development economists, in order to improve the wellbeing of the poor and to promote social cohesion. In order to achieve the aforementioned objectives, the study used primary data which were collected through the use of a structured and self-administered questionnaire. Before the actual data of the current study were collected, the ethical clearance certificate was issued by the University

of Zululand. In addition, the questionnaire was translated into IsiXhosa, as the main spoken language in the rural areas of Mbizana.

The systematic random sampling was used to select the participants in the Isikelo location. This is a method of selecting a random sample from a larger population, and the process of systematic sampling normally involves first selecting a fixed starting point and then obtaining succeeding observations by using a constant interval between samples taken. Since it was difficult to find the sample frame of the households in each ward, the study opted to target every 5th household, and if that household was unavailable or unwilling to get involved, then the immediate neighbour was selected and thereafter the 5th household was selected.

Some wards possessed clearly demarcated roads and in such instances, every second road (or lane) was selected and we continued thereafter to select every fifth householder. In this manner, the researcher and four trained field workers succeeded in collecting a sample of 330 householder participants. The advantage of using random sampling enables a researcher to draw inferences about the entire population. However, due to financial and time constraints, the study was only able to collect data from the Isikelo Community, which is only one of the 10 sections into which the Mbizana Municipality is subdivided.

The Isikelo Community comprises 4 wards, of which 3 were randomly chosen for investigation. These wards included Ward 4 (Umdeni, Ludeke etankini, Ludeke section D, and Mdikiso), Ward 5 (Mtamvuna, Mmangweni, Ndayingane, Mbhobheni, Nqwelo Yombaso, and Gwala), and Ward 26 (Mount Zion, Mbhobheni G section, and Nomlacu). All the wards in the Mbizana area are considered to be similar in characteristics of the type of dwelling, land size, social and income status hence one may use the findings albeit gained from data from 3 wards to make generalisations about the entire Mbizana local municipality population.

Two measures were used to estimate the food security variable, the first being the dietary diversity approach, where the proxy of food security status was measured using the number of food groups consumed by households over the previous 24 hours and they are then scored. A household is considered to be food secure if they score above 5. The second measure was the household food insecurity access scale (HFIAS), which is a commonly

used approach globally and comprises the asking of 18 questions, with either ‘yes’ or ‘no’ responses, regarding the respondents’ experiences and perceptions of issues pertaining to food security issues. If a respondent was deemed to be mildly, moderately or highly food insecure, then the household was categorized as being food insecure. Hence, the study used these two versions of the dependent variable to run two logit regressions, respectively against the same set of possible determinants. SPSS (Statistical Package for Social Science, version 25) was used to code and run the cross tabulations, while STATA 14 was utilised to run both logit models. Lastly, the E-views software was employed to perform the diagnostic tests, such as Hosmer-Lemeshow and Wald test.

6.3 Summary of the findings and policy recommendations

The study used two approaches to examine the food security status in the aforementioned area. The household food insecurity access scale was used to assess whether the household was food secure in a period of 30 days. Hence, the findings that were presented in Chapter 5 show that the majority of households (62%) were food insecure, while 38% were found to be food secure.

In addition, the households whose score was 5 or less were considered as food insecure, while households with 6 points or more were deemed food secure. In comparison, the dietary diversity scores show that 52% of the households were food insecure, whereas 48% were found to be food secure. There was quite a discrepancy between the two measures of food insecurity, however, the study gave preference to the household food insecurity access scale, due to its quality and reliability because it used a norm of 30 days, unlike the dietary diversity, which used the data of the previous 24 hour recall and lastly, it is a commonly used measure of food insecurity globally.

It was also noted that the NGOs, together with the local government, do not offer start-up funding or other forms of agri-business support to the households to finance the farming activities in the area. This kind of support would assist many needy households, not necessarily to plough for their own consumption, but to start the small agro-businesses which could positively contribute to the total monthly income and also allow them to have more access to food of the best quality.

In both logit models, the social security grants coefficients were negatively associated with food security status. This finding suggests that the recipients of such grants are less likely to be food secure. The reason for this to happen might due to reliance on security grant than engaging in other activities that could increase the overall household income. A positive relationship was found between food security and households' total monthly income. Holding other factors constant, a unit increase in household income increases the chances for the households to be food secure. Therefore, the government should encourage the households to participate in other activities that will generate more income than depending on social security grants.

Based on the findings obtained from both logit models, the households' remittances were positively related to food security status, which indicates that when remittances increase by a unit, this leads to an increase in access to food. Hence, the household members who are working need to be encouraged through social welfare, community, savings clubs and church organisations to assist their relatives by giving them some money in a form of remittance in order to access sufficient food to prevent food insecurity.

The membership in the maize project in the study area was positively associated with food security status. Therefore, the rural households need to be motivated and encouraged to join such cooperatives. In the process of data collection, the financial constraint to join the farm association was noted as one of the reasons for the rural indigent households to refrain from being involved in the maize project in the Isikelo community. Hence, the government has to assist them in terms of funding, particularly the needy.

The cross tabulations showed that male-headed households were found to be food secure relative to female counterparts. In both logit models, gender has a positive impact on food security. The local government should redouble its efforts to empower women through organising them into empowerment groups that get involved in seasonal public works programmes, skills development for employment and for entrepreneurial activities.

The findings from the second model show a negative relationship between food security status and subsistence farming (own food production). It is likely that subsistence farming is low yielding with regard to productivity due to crops taking a while to be harvested.

Training subsistence farmers to increase productivity might be a possible solution. Assisting such farmers by leasing them tractors and other equipment, perhaps through a communal scheme, offering them subsidised fertiliser, and improved seeds, technical advice and other necessities, might assist in raising yields. The results also showed that those households who were involved in animal husbandry were more food secure, hence subsistence farmers ought to be taught to diversify their farming activities.

The second logit model shows a positive association between food security and improved seeds. This means that when the use of improved seeds increases, it leads to an increase in households' food security. There is a need for the government to help the rural indigent household by subsidizing the purchase of improved seeds. The second model also shows a positive relationship between farm income (from crops production) and food security status. This indicates that the rural households need to be encouraged to start up agri-businesses.

In the second logit model, there is negative relationship between food security and household size. Therefore, there is a need for programmes to alert the households to focus on family planning in order to keep their size as low as possible. Hence, such programmes could assist households to cut down on their expenditures because the dependency ratio will decrease.

In the second logistic regression, the marital status was positive and statistically significant. Assuming that other factors are held constant, these findings suggest that married households are more likely to be food secure than single-person-headed households. It is possible that the majority of the single households are also female headed, which reinforces the point about local government empowering women. However, more careful analysis must be done to assess the nature of the single-person-headed households to assess the distributions between males and females.

Lastly, it was found that 25 randomly selected households in Ward 4 were recipients of pay outs from land restitution claims, however, this cohort, relative to the total sample were found to be food insecure. Upon further investigation, it was found that most of them spent the funds on home renovations and extensions, and the purchase of durable goods and

consumption, instead of investing in agri-business or other entrepreneurial activities. Hence, it is recommended that government guide such recipients in financial planning and to encourage them to get involved in entrepreneurial activities.

6.4 Limitation of the study and future direction of research

Due to financial and time constraints, the study only covered one district (Isikelo Community), with three of the four wards being selected for study. The Mbizana Municipality, being a rural area is quite spread out, hence it was not possible to cover a larger number of wards over a three-month period. However, to derive a fuller account of the challenge of food insecurity, other rural areas need to be incorporated into the study. In addition, even though the study seems to provide robust findings, it should be noted that if more rural areas were included the study, would have had a larger sample size and would have produced much robust results, since logistic regression models tend to perform better with very large samples.

The response variable of the first logit model was coded as binary outcome (1, food secure, if the respondent scored 6 points or more while households whose score were 5 or less were regarded as food insecure and coded as 0). This is an arbitrary choice, once could have segmented to scores into three groups: highly insecure, moderately insure and secure (less than 4, from 4 to 7 and greater than 7, for example), and used a multinomial logistic regression approach to make comparisons. The literature has shown that the dietary diversity scores do not have cut-off points, which makes it difficult to arrive at a conclusion with regard to the adequacy of diet. This is one of the reasons that led the researcher to create the aforementioned cut-off points.

Although the study has produced reasonable results, more research needs to be conducted to attempt multinomial models and to compare them to binary ones. Furthermore, collaborative work needs to be done with consumer scientists to correlate diversity or HFIAS scores with adequacy of diet so that one may get a better sense of cutoff points. Moreover, the study has omitted the impact of the livelihood diversification on households' food security status. Therefore, the future studies should include more rural areas and examine such relationships in the Alfred Nzo district where the Mbizana local municipality is situated.

6.5 Conclusion

This chapter provided the summary of the study which covered the objectives, the type of statistical data that was used, the methodology and the types of software that were used to run the data. Secondly, this chapter presented the summary of the findings and also provided the policy recommendations. Lastly, the chapter discussed the limitations of the study and also provided the implication for future research.

LIST OF REFERENCES

Abafita, J. & Kim, K. (2013). Determinants of household food security in rural Ethiopia: An empirical analysis. *Journal of Rural Development, 37*(2):129-159.

Abdulla, A.M. (2015). Determinants of household food security and coping strategies: the case of bule-hora district, Borana Zone, Oromia, Ethiopia. *European Journal of Food Science and Technology*, *3*(3):30-44.

Abdulla, Zhou, D., Shah, T., Ali, S., Ahmad, W., Din, I.U. &Ilyas, A. (2017). *Factors affecting household food security in rural northern hinterland of Pakistan.* Available at http://dx.doi.org/10.1016/j.jssas.2017.05.003 (Accessed 07/05/2017)

Abdu-Raheem, K.A. & Worth, S.H. (2011). Household food security in South Africa: evaluating extension's paradigms relative to the current food security and development goals. *South African Journal of Agricultural Extension*, *39*(2):91-103.

Abel, M. (2015).*Long-run effects of forced removal under aphartheid on social capital*. Harvard University Economic History. Harvard University, Cambridge.

Abu, G.A. & Soom, A. (2016). Analysis of factors affecting food security in rural and urban farming households of Benue State, Nigeria. *International Journal of Food and Agricultural Economics*, *4*(1):55-68.

Abubakari, F. & Abubakari, F. (2015). Determinants of household food security and climate change impact on agriculture in the upper East Region of Ghana. *Academic research Journal of Agricultural Science and Research*, *3*(7):178-183.

Abur, C.C. (2014). Assessment of Food Security Status among Rural Farming Households in Guma Local Government Area of Benue State, Nigeria. *International Journal of Research in Humanities and Social Studies,1*(2):34-42.

Adekunle, O.O. (2013). The role of home gardens in household food security in Eastern Cape: A case study of three villages in Nkonkobe Municipality. *Journal of Agricultural Science*, *5*(10):67-76.

Adeniyi, O.R. &Ojo, O.A. (2013). Food security status of rural farming households in Iwo, Ayedire and Ayedaade local government areas of Osun State, South-Western Nigeria. *African Journal of Food, Agriculture, Nutrition and Development*, *13*(5):8209-8223.

Adepoju, A.O. & Adejare, K.A. (2013). Food insecurity status of rural households during the Post-planting season in Nigeria. *Journal of Agriculture and Sustainability, 4*(1):16-35.

Afza, J., Tama, R.A.Z., Begum, I.A. & Ethen, D.Z. (2015). Livestock and Rural Household Food Security: A Case of Gazipur District of Bangladesh. *International Journal of Innovation and Applied Studies*, *12*(3):747-755.

Agada, M. &Igbokwe, E. (2016). Influence of Food Culture and Practices on Household Food Security in North Central Nigeria. *Journal of Food Security*, *4*(2):36-41.

Agbola, P.O. (2014). Factors influencing food insecurity among small farmers in Nigeria. *African Journal of Agricultural Research*, *9*(27):2104-2110.

Ahmed, F.F. &Abah, P.O. (2014). Determinants of Food Security among Low-Income Households in Maiduguri Metropolis of Borno State, Nigeria. Asian Journal of Social Science & Humanities, 3(1):74-86.

Ahmed, F.F., Mohammed, M., &Abah, P.O. (2015). An Analysis of Socio-Economic Characteristics and Food Security Situation among Semi-Urban Households: A Case Study of Biu and Bama Local Government Areas in Borno State, Nigeria. Available at http://www.iiste.org/Journals/index.php/DCS/article/viewFile/20921/21165 (Accessed 04/08/2016).

Aidoo, R., Mensah, J.O. & Tuffour, T. (2013). Determinants of household food security in the Sekyere-Afram plains district of Ghana. In *Proceedings of 1st Annual International*

Interdisciplinary Conference, Portugal: Egalite European Science Institute Publishing, 3:514-521.

Akudugu, M.A., Dittoh, S. &Mahama, E.S. (2012). The implications of climate change on food security and rural livelihoods: Experiences from Northern Ghana. *Journal of Environment and Earth Science*, *2*(3):21-29.

Alem, S. (2007). *Determinants of food insecurity in rural households in Tehuludere Woreda, South Wello Zone of the Amhara Region*. Masters dissertation, Addis Ababa University, Ethiopia.

Alexopoulos, E.C. (2010). Introduction to multivariate regression analysis. *Hippokratia*, *14*:23-28.

Ali, A. & Khan, M.A. (2013). Livestock ownership in ensuring rural household food security in Pakistan. *The Journal of animal and plant Science*, *23*(1):313-318.

Altman, M., Hart, T. & Jacobs, P. (2009). Household food security status in South Africa. *Agrekon*, *48*(4):345-361.

ANDM [Alfred Nzo District Municipality] (2014), Alfred Nzo District Municipality Integrated Development Plan 2014/2015. Alfred Nzo District Municipality. Available at http://www.andm.gov.za/Documents_Download/IDP/Documents/ANDM%20IDP%202014-15%20Financial%20Year.pdf [accessed 14/02/2017].

Anim, F.D.K., Chauke, P.K. & Aluwani, M. (2016). Analysis of Factors Responsible for Access to Food Security by Beneficiaries of Cooperatives: A Multinomial Logit Approach. *Journal of human ecology*, *54*(1):35-40.

Archary, L. (2012). Reversing the legacy of the 1913 Natives Land Act. In powerpoint presentation at *The Rural Economy Transformation Conference, October*: 5-6.

Arene, C. &Anyaeji, C. (2010). Determinants of food security among households in Nsukka Metropolis of Enugu State, Nigeria. *Pakistan Journal of Social Sciences, 30*(1):9-16.

Asankha, P. & Takashi, Y. (2011). Impacts of universal secondary education policy on secondary school enrollments in Uganda. *Journal of Accounting, Finance and Economics, 1*(1):16-30.

Ashaver, B.T. (2013). Poverty, Inequality and Underdevelopment in Third World Countries: Bad State Policies or Bad Global Rules? *Journal of Humanities and Social Science, 15*(6):33-38.

Aslam, M. &Rasool, S. (2014). Investigating the Impact of Major Variables Influencing Food Security in Lahore, Pakistan. *International Journal on Advanced Science, Engineering and Information Technology*, *4*(3):143-147.

Asmelash, M. (2014). Rural household food security status and its determinants: The case of Laelay Machew Woreda, Central Zone of Tigrai, Ethiopia. *Journal of Agricultural Extension and Rural Development*, *6*(5):162-167.

Asogwa, B.C. &Umeh, J.C. (2012). Food insecurity determinants among rural farm households in Nigeria. In *International conference on Ecology, Agriculture and Chemical Engineering (ICECS' 2012),* December :18-19, 2012, Phuket (Thailand).

Atkinson, D. (2007). Going for Broke. *The fate of farmworkers in Arid South Africa*. Human sciences research Council, Cape Town.

Bailey, D. (2007). *Land reform in South Africa: a qualitative analysis of the land redistribution for agricultural development programme using experiences from the case study in KwaZulu-Natal*. Masters dissertation, University of KwaZulu-Natal, South Africa.

Baiphethi, M.N. & Jacobs, P.T. (2009). The contribution of subsistence farming to food security in South Africa. *Agrekon*, *48*(4):459-482.

Balarane, A. (2013). *Impact of irrigation farming on livelihood strategies, household food security and poverty status among smallholder farmers in the North West Province, South Africa*. Masters dissertation, North West University, South Africa.

Baloyi, J.K. (2010). *An analysis of constraints facing smallholder farmers in the Agribusiness value chain: A case study of farmers in the Limpopo Province.* Master's dissertation, University of Pretoria, South Africa.

Bashir, M.K. & Schilizzi, S. (2013). Determinants of rural household food security: a comparative analysis of African and Asian studies. *Journal of the science of food and agriculture, 93*(6):1251-1258.

Beattie, R.M., Brown, N.J. & Cass, H. (2015). Millennium development goals progress report. *Archives of disease in childhood.* Published by group.bmj.com

Bebbington, A. (1999). Capital and capabilities: a framework for analysis peasant viability, rural livelihoods and poverty. *World development, 27*(12):2021-2044.

Bernstein, H., Crow, B. & Jonson, H. (1992). *Rural livelihoods: crises and responses*.

Oxford University Press.

Bewick, V., Cheek, L. & Ball, J. (2005). Statistics review 14: logistic regression. *Critical Care*, 9:112-118.

Beyene, F. &Muche, M. (2010). Determinants of food security among rural households of Central Ethiopia: an empirical analysis. *Quarterly Journal of International Agriculture*, *49*(4): 299-318.

Bhuiya, A., Mahmood, S.S., Rana, A.M., Wahed, T., Ahmed, S.M. & Chowdhury, A.M.R. (2007). A multidimensional approach to measure poverty in rural Bangladesh. *Journal of health, population, and nutrition*, *25*(2): 134-145.

Bhutta, Z.A., Sommerfeld, J., Lassi, Z.S., Salam, R.A. & Das, J.K. (2014). Global burden, distribution, and interventions for infectious diseases of poverty. *Infectious diseases of poverty*, *3*(21):1-7.

Bikombo, B.G. (2014). *Understanding household food insecurity and coping strategies of street traders in Durban*. Master's dissertation, University of South Africa, South Africa.

Bimerew, T.G. &Beyene, F. (2014). Factors influencing rural household food insecurity: the case of Babile District, East Hararghe Zone, Ethiopia. *Journal of development and agricultural economics, 6*(4):149-158.

Binswanger, H.P. & Elgin, M. (1992). What are the prospects for land reform? In Eicher and Staatz (eds). *Agricultural development in third world*, 2nd edition, London:342-344.

Birhane, T., Shiferaw, S., Hagos, S. & Mohindra, K. (2014). Urban food insecurity in the context of high food prices: a community based cross sectional study in Addis Ababa, Ethiopia. *BMC Public Health, 14*(1):1–8.

Black, R. (2003). Micronutrient deficiency: an underlying cause of morbidity and mortality. Bulletin of the world health organisation, 81(2):79-79.

Black, R.E., Allen, L.H., Bhutta, Z.A., Caulfield, L.E., De Onis, M., Ezzati, M., Mathers, C., Rivera, J. & maternal and child under-nutrition study group, (2008). Maternal and child under-nutrition: global and regional exposures and health consequences. *The lancet*, *371*(9608):243-260.

Boeing, H., Bechthold, A., Bub, A., Ellinger, S., Haller, D., Kroke, A., Leschik-Bonnet, E., Müller, M.J., Oberritter, H., Schulze, M. & Stehle, P. (2012). Critical review: vegetables and fruit in the prevention of chronic diseases. *European journal of nutrition*, *51*(6):637-663.

Boniphace, N.S., Fengying, N. & Chen, F. (2015). An analysis of smallholder farmers' socio-economic determinants for inputs use: A case of major rice producing regions in Tanzania. *Russian Journal of Agricultural and Socio-Economic Sciences, 2* (38):41–55.

Bonti-Ankomah, S. (2001). *Addressing food insecurity in South Africa*. Pretoria: The national institute for economic policy. Available at http://www.sarpn.org.za/EventPapers/Land/20010605Bonti.pdf (accessed 5/05/2016).

Boserup, E. (1965). *The conditions of agricultural progress*. Chicago, IL: Aldine Publishing Company.

Burchi, F., & De Muro, P. (2012*). A human development and capability approach to food security: Conceptual framework and informational basis*. Background paper 2012/08 for the African human development report towards a food secure future, UNDP, Regional Bureau for Africa.

Burchi, F. & De Muro, P. (2016). From food availability to nutritional capabilities: advancing food security analysis. *Food Policy,* 60: 10-19.

Burton, R. (2013). Maternal health: there is cause for optimism. *South African 1 Medical Journal,103*(8):520-521.

Buthelezi, N.B.C. (2008). *The impact of the land restitution programme on poverty*. Masters' dissertation, University of Pretorea: South Africa.

Carney, D. (1998). Sustainable rural livelihoods: *what contributions can we make?* Department for international development, London.

Claassens, A. & Boyle, B. (2015). A Promise Betrayed: Policies and practice renew the rural dispossession of land, rights and prospects. *Policy briefing 124, governance of Africa's resources programme*.

Chambers, R. & Conway, G. (1992). Sustainable rural livelihoods: practical concepts for the 21st century. Institute of development studies, United Kingdom.

Chapman, R., Slaymaker, T. & Young, J. (2003). *Livelihoods approaches to information and communication in support of rural poverty elimination and food security*. Overseas Development Institute, London.

Chambers, R. (1983). *Rural development: putting the last first*. London: Longman.

Chaudhary, A. (2013). Modernization: Impact, theory, advantages and disadvantages. *International Journal for Research in Education*.

Chepng'etich, E., Nyamwaro, S.O., Bett, E.K. & Kizito, K. (2015). Factors that Influence technical efficiency of Sorghum production: A Case of small holder Sorghum producers in lower Eastern Kenya. *Advances in Agriculture*, *2015*.

Chinnakali, P., Upadhyay, R.P., Shokeen, D., Singh, K., Kaur, M., Singh, A.K., Goswami, A., Yadav, K. &Pandav, C.S. (2014).Prevalence of household-level food insecurity and its determinants in an urban resettlement colony in north India. *Journal of health, population, and nutrition*, *32*(2):227-236.

Christopher, A. (2001). The atlas of changing South Africa. Psychology Press.

Coates, J., Swindale, A. & Bilinsky, P. (2007). Household Food Insecurity Access Scale (HFIAS) for measurement of food access: indicator guide. *Washington, DC: Food and nutrition technical assistance project, academy for educational development*.

Cohen, J.E. (1995). How many people can the earth support?. *The sciences*, *35*(6):18-23.

Coles, C. M. (1993). Land reform for post-apartheid South Africa. *Boston college environmental affairs Law review Journal, 20*(4):700-758.

Connolly-Boutin, L. & Smit, B. (2016). Climate change, food security, and livelihoods in sub-Saharan Africa. *Regional environmental change*, *16*(2):385-399.

Coveney, J. &O'Dwyer, L.A. (2009). Effects of mobility and location on food access. *Health place, 15*(1):45-55.

Creswell, J.W. (2009). *Research Design: Qualitative, quantitative, and mixed methods approaches*, 3th Edition. London: Sage.

Creswell, J.W. (2014*). Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*, 4th Edition. London: Sage.

Dasgupta, P. (1993). *An inquiry into well-being and destitution*. Oxford University Press on Demand.

De Cock, N., D'Haese, M., Vink, N., Van Rooyen, C.J., Staelens, L., Schönfeldt, H.C. & D'Haese, L. (2013). Food security in rural areas of Limpopo Province, South Africa. *Food Security*, *5*(2):269-282.

Deininger, K., Jin, S. &Nagarajan, H.K. (2009). Land reforms, poverty reduction, and economic growth: evidence from India. *The Journal of Development Studies*, *45*(4):496-521.

De Muro, P. &Burchi, F. (2007). Education for rural people and food security. *A Cross Country Analysis. Food and Agricultural Organization of the United Nations, Rome*.

De Souza Bittencourt, L., dos Santos, S.M.C., de Jesus Pinto, E., Aliaga, M.A. & de Cássia Ribeiro-Silva, R. (2013). Factors associated with food insecurity in households of public school students of Salvador City, Bahia, Brazil. *Journal of health, population, and nutrition*, *31*(4):471-479.

DFID [Department for International Development], (1999). Sustainable *Livelihoods: Lessons from early experiences*. Department for International Development, 94 Victoria Streets, London.

D'Haese, M., Vink, N., Nkunzimana, T., Van Damme, E., Van Rooyen, J., Remaut, A.M., Staelens, L. & D'Haese, L. (2013). Improving food security in the rural areas of KwaZulu-Natal province, South Africa: Too little, too slow. *Development Southern Africa*, *30*(4-5):468-490.

Dhliwayo, P. (2012). Tenure security in relation to farmland. Masters dissertation, Stellenbosch University, South Africa.

Dikgang, J. &Muchapondwa, E. (2016). The effect of land restitution on poverty reduction among the Khomani San "bushmen" in South Africa. *South African Journal of Economics*, *84*(1):63-80.

DLA [Department of Land Affairs], (1997). *White paper on South African land policy*. Department of land affairs, South African government:1-139.

Dlamini, S. (2008). *Taking land reform seriously: From willing seller-willing buyer to expropriation*. Master's dissertation, University of Cape Town, South Africa

Dlamini, M.A. (2010). *A case study of land reform project in KwaZulu-Natal with specific reference to the Nkaseni restitution land claim*. Masters dissertation, University of KwaZulu-Natal, South Africa.

Dlamini, N.E. *(2013). Diet diversity and food access of deep-rural households of Idutywa, Eastern Cape Province*. Masters dissertation, University of South Africa: South Africa.

Dobermann, A. & Nelson, R. (2013). Opportunities and solutions for sustainable food production. *Background paper for the High-Level Panel of Eminent Persons on the Post-2015 Development Agenda. Prepared by the co-chairs of the sustainable development solutions network thematic group on sustainable agriculture and food production*.

DRDLR [Department of Rural Development & Land Reform], (2013). *The 1913 Natives' Land Act has left a legacy that we must reverse*. April 2013 newsletter from the department of rural development and land reform, South African government.

Dodson, A. (2013). *The Natives Land Act of 1913 and its Legacy, Forum*,1 – 4. Source?

Dreze, J. & Sen, A. (1989). *Hunger and public action*. Oxford University Press.

Duskin, M.S. (1995). Institutions: physician for social responsibility. *Environment, science and policy for sustainable development, 37*(7):44-45.

Du Toit, D.C., Ramonyai, M.D., Lubbe, P. A. & Ntushelo, V. (2011). *Food security. Department of Agriculture, forestry and fisheries*: Republic of South Africa.

Earl, A. (2011). Solving the food security crisis in South Africa: How food gardens can alleviate hunger amongst the poor, *Journal of agricultural economics,* 4:8-11.

Eastin, J. & Prakash, A. (2013). Economic development and gender equality: Is there a gender Kuznets curve? *World Politics*, *65*(01):156-186.

ECA & AUC [Economic Commission for Africa & African Union Commission], (2013). *Economic report on Africa 2013-making the most of Africa's commodities: industrialising for growth, jobs, and economic transformation*. Economic Commission for Africa, Addis Ababa: Ethiopia.

EDAR [Economic Development in Africa Report]. (2014). *Catalyzing investment for transformation growth in Africa*. New York: United Nations Publication.

Edeh, H.O. &Gyimah-Brempong, K. (2015). Determinants of change and household responses to food insecurity: Empirical evidence from Nigeria. *African Journal of Agricultural Research*, *10*(5): 423-433.

Edewor, P.A. (2014). A Conceptual Exploration of the Human Development Paradigm. *Mediterranean Journal of Social Sciences*, *5*(6):381-388.

Ellis, F. (2000). The determinants of rural livelihood diversification in developing countries. *Journal of Agricultural Economics,* 51(2):289-302.

Enadle, W., Birhanu, Z., Atinafu, A. & Awoke, A. (2014). Food insecurity in Farta District, Northwest Ethiopia: a community based cross sectional study*. BMC research notes, 7*(130):1–6.

Endalew, B., Muche, M. &Tadesse, S. (2015). Assessment of food security situation in Ethiopia. *World Journal of Dairy and Food Sciences*, *10*(1):37-43.

ES [Employers summit]. (2015). *Press invite employers summit Africa.* Promoting business growth and entrepreneurship for job creation. Nairobi: Federation of Kenya Employers.

Fanzo, J. (2012) The nutrition challenge in Sub-Saharan Africa. United Nations Development Programme, New York. Available at: http://www.undp.org/content/dam/rba/docs/Working%20Papers/Nutrition%20Challenge.pdf (accessed 21 April 2013).

FAO [Food and agriculture organization], (2006). *Food security*. FAO's Agriculture and Development Economics Division (ESA) with support from the FAO Netherlands Partnership Programme (FNPP) and the EC-FAO Food Security Programme.

FAO [Food and Agriculture Organization], (2010). *The state of food insecurity in the World: Addressing food insecurity in protracted crises*. Rome.

FAO [Food and Agriculture Organization], (2010). *Food comes first-FAO and the eight Millennium Development Goals*. FAO and the eight millennium development goals: Food and agriculture organisation of the United Nations. Rome.

FAO [Food and Agriculture Organization], (2011). *The state of food and agriculture, women in agriculture closing the gender gap for development*. Food and agriculture organization of the United Nations. Rome.

FAO [food and Agriculture Organization], (2013). *The state of food insecurity in the world: meeting the 2015 international hunger target*. Food and agriculture organisation of the United Nation. Rome.

FAO [Food and Agriculture Organization], (2015). *The state of food insecurity in the world. Meeting the 2015 international hunger targets: taking stock of uneven progress*. Food and agriculture organisation of the United Nations. Rome.

FAO [Food and Agriculture Organization], (2015). FAO statistical pocketbook: World food and agriculture. Food and agriculture organisation of the United Nations. Rome.

FAO [Food and Agriculture Organization], (2017). *The state of food security and nutrition in the world: building resilience for peace and food security*. Food and Agriculture of the United Nations. Rome.

Fehling, M., Nelson, B.D. & Venkatapuram, S. (2013). Limitations of the Millennium Development Goals: a literature review. *Global Public Health*, *8*(10):1109-1122.

Finn, M., Elliot-White, M. & Walton, M. (2000). Tourism and Leisure Research Methods: Data Collection, Analysis and Interpretation. London: Pearson Education.

Frantz, G. (2010). *Repealing the subdivision of agricultural land Act: A constitutional analysis*. Masters' dissertation, Stellenbosch University: South Africa.

Garedow, B.T. &Edriss, A.K. (2014). The Dynamics of Land Market and Food Security in Malawi. *International Journal of Sustainable Development and World Policy*, *3*(5):115-131.

Gebre, G.G. (2012). Determinants of food insecurity among households in Addis Ababa city, Ethiopia. *Interdisciplinary Description of Complex Systems*, *10*(2):159-173.

Gemechu, F., Zemedu, L. &Yousuf, J. (2016). Determinants of farm household food security in HawiGudina district, West Hararghe zone, Oromia Regional National State, Ethiopia. *Journal of Agricultural Extension and Rural Development*, *8*(2):12-18.

Gibson, N. C. (2012). What happened to the promised land? A Fanonian Perspective on Post-Apartheid South Africa.*Antipode,* 44(1):51-73.

Goldman, I., Carnegie, J., Marumo, D., Kela, E., Ntonga, S. & Mwale, E. (2000). Institutiona support for sustainable rural livelihoods in Southern Africa: framework and methodology. *Natural resources perspectives, 49*:1-12.

Goshu, D., Kassa, B. & Ketema, M. (2013). Measuring diet quantity and quality dimensions of food security in rural Ethiopia. *Journal of Development and Agricultural Economics*, *5*(5): 174-185.

Grobler W.C.J. (2013). Food security of Social Grant Recipients in Low Income Neighborhood in South Africa. *Proceedings of the World Business and Social Science Research Conference*. Novotel Bangkok on Siam Square, Bangkok, Thailand. 24-25 October 2013.

Grobler, W.C.J. (2014). Food insecure household coping strategies: The case of a low income neighbourhood in South Africa. *Mediterranean Journal of Social Sciences,* *5*(13):100-106.

Grobler, W.C.J. (2015). The determinants of urban food security: Insights from a low income neighborhood in South Africa. In *proceedings of international academic conferences*. International institute of social and economic sciences.

Gujarati, D. (2004). *Essentials of econometrics*, 4th edition. McGraw-Hill Education. New York.

Gujarati, D. N. & Porter, C.D. (2009). *Basic econometrics*. McGraw-Hill international edition. New York.

Gunatilake, M.M. (2015) Drought and household food security in rural Sri Lanka: A case Study. *International Journal of Scientific Research and Innovative Technology, 2*(7):1-410.

Gustafson, D.J. (2013). Rising food costs & global food security: key issues & relevance for India. *The Indian Journal of medical research*, *138*(3):398-410.

Hackett, M., Melgar-Quiñonez, H., Taylor, C.A. & Uribe, M.C.A. (2010). Factors associated with household food security of participants of the MANA food supplement program in Colombia. *Archivoslatinoamericanos de nutricion*, *60*(1):42-47.

Hailombe, O. (2011). *Education equity and quality in Namibia: a case study of mobile schools in the Kunene region*. Doctoral thesis, University of Pretoria, South Africa.

Hall, R. (2014). The legacies of the Natives Land Act of 1913. *Scriptura: International Journal of bible, religion and theology in Southern Africa*, *113*(1):1-13.

Hanson, C. (2013). Food security, inclusive growth, sustainability, and the post-2015 development agenda. *Background research paper submitted to the high level panel on the Post-2015 development agenda.* New York: United Nations.

Heinemann, E., Prato, B. & Shephered, A. (2011). Rural Poverty Report 2011. *International fund for agricultural development,*Rome.

Helliker, K. (2013). *Reproducing white commercial agriculture in South Africa*. Sociology department, Grahamstown: Rhodes University, South Africa.

Henri-Ukoha, A., Ibekwe, U.C., Chidiebere-Mark, N.M., Ejike, R. & Oparadim (2013). Determinants of food security in female-headed households involved in individual tenure system in Abia state, Southeast Nigeria. *Global Journal of Agricultural Research1*(2):48-57.

Hill, R. (1998). What sample size is “enough” in internet survey research? Interpersonal computing and technology: *An electronic Journal for the 21st Century, 6*:3-4. Retrieved from http://www.emoderators.com/ipct-j/1998/n3-4/hill.html (accessed 20/01/2017).

Hosmer, D. & Lemeshow, S. (2000), *Applied Logistic Regression*. 2nd edition. John Wiley and Sons, inc. New York.

Hamann, M. & Tuinder, V. (2012). Introducing the Eastern Cape: A quick guide to its history, diversity and future challenges. *A report for the Stockholm resilience Center: Research for governance of social-ecological systems*.

Hussein, W. & Janekarnkij, P. (2013). Determinants of rural household food security in Jigjiga district of Ethiopia. *Kasetsart Journal of social science, 34*:171-180.

Ibok, O.W., Bassey, N.E., Atairet, E.A. & Obot, O.J. (2014). Food security determinants among urban food crop farming households in Cross River state, Nigeria. *Asian Journal of Agricultural Extension, Economics and Sociology*, *3*(1):76-90.

Ifeoma, I. &Agwu, A. (2014). Assessment of food security situation among farming households in rural areas of Kano state, Nigeria. *Journal of central European agriculture*, *15*(1):94-107.

IFPRI [International Food Policy Research Institute]. (1995). *A 2020 vision for food, agriculture and the environment. The vision, challenge, and recommended action*.

IFSS [Integrated Food Security Strategy]. (2002*). Integrated food security strategy for South Africa*. Pretoria: department of agriculture, Republic of South Africa.

Igbinidu, O. &Osarenren, C.O. (2015). Effect of Yam-Based Production on Food Security Status of Farm Households in Edo South, Nigeria. *International Journal of Environmental & Agriculture Research, 1*(6):28-35.

Iorlamen, T.R., Abu, G.A. &Lawal, W.L. (2013). Comparative Analysis on Socio-economic Factors Between Food Secure and Food Insecure Households among Urban Households in Benue State, Nigeria. *Journal of Agricultural Science*, *4*(2):63-68.

IPCC [Intergovernmental Panel on Climate Change]. (2007). Climate change: Impacts, adaptation and vulnerability. *Contribution of working group II to the fourth assessment report of the intergovernmental panel on climate Change, 2007*. Cambridge University Press.

Iqbal, S., Mohyuddin, A. &Idrees, B. (2016). Food security and nutrition in Pakistan: the role of foreign remittances. *Science International*, *28*(1):653-657.

Ivers, L.C. & Cullen, K.A. (2011). Food insecurity: special considerations for women. *The American Journal of clinical nutrition*, *94*(6): 1740-1744.

Jacobs, P. & Hart, T. (2014). Pro-poor rural development in South Africa? In T. Meyiwa, M. Nkondo, M. Chitinga-Mabugu, M. Sithole, & N.F.N. Nyamnjoh, State of the nation-South Africa 1994-2014: a twenty year review. Pretoria: HSRC Press.

Jebran, K., Abdullah, A., Iqbal, A. &Ullah, I. (2016). Effects of remittances on per capita economic growth of Pakistan. *Pakistan Business Review*, *18*(1):1-18.

Jenkins, J.C. &Scanlan, S.J. (2001). Food security in less developed countries, 1970 to 1990.*American Sociological Review*, 66(5):718-744.

Jordaan, F. (2014). *Exploring household food security in the Viljoenskroon area*. Masters dissertation, North West University: South Africa.

Jones, A.D., Ngure, F.M., Pelto, G. & Young, S.L. (2013). What are we assessing when we measure food security? A compendium and review of current metrics. *Advances in Nutrition: An International Review Journal*, *4*(5):481-505.

Jonsson, F.A. (2014). The origins of cornucopias: A preliminary genealogy. *Critical historical studies*, *1*(1):151-168.

Kahsay, S. & Mulugeta, M. (2014). Determinants of rural household food insecurity in LaelayMaichewWoreda Tigray, Ethiopia. *African Journal of agriculture and food security*, *2*(1):106-112.

Kakwani, N. & Son, H. (2015). Measuring food insecurity: Global estimates. *ECINEQ Working Paper Series No. 370, Milano: Society for the study of economic inequality*. Available at http://www.un.org/esa/socdev/egms/docs/2015/sd-agenda2030/Kakwani-Paper.pdf (Accessed 09/09/2017).

Kamba, MA. (2009). Access to information: the dilemma for rural community development in Africa. Retrieved from https://smartech.gatech.edu/jspui/bitstream/1853/36694/1/1238296264_MA.pdf (Accessed 7/06/2016).

Kariuki, S. (2007). Political compromise on land reform: A study of South Africa and Namibia. *South African Journal of International Affairs, 14*(1):99-114.

Kariuki, J., Njuki, J., Mburu, S. and Waithanji, E. (2013). Women, livestock ownership and food security. Research brief. Nairobi, Kenya:ILRI.

Kennedy, G., Ballard, T. & Dop, M.C. (2011). *Guidelines for measuring household and individual dietary diversity*. Food and Agriculture Organization of the United Nations.

Kepe, T. &Tessaro, D. (2012). *Integrating food security with land reform: a more effective policy for South Africa*. Centre for international governance innovation.

Kgatla, S.T. (2013). Forced removals and migration: a theology of resistance and liberation in South Africa. *Missionalia,41*(2):120-132.

Khan, M.H. (2000). *Rural poverty in developing countries: Issues and politics*. Working Paper no. 00/78, International Monetary Fund working paper.

Khan, R.E.A. & Gill, A.R. (2009). *Determinants of food security in rural areas of Pakistan*. Department of economics, the Islamia University of Bahawalpur. Pakistan, Paper no. 8.

Kidane, H., Alemu, Z.G. & Kundhlande, G. (2005). Causes of household food insecurity in Koredegaga peasant association, Oromiya zone, Ethiopia. *Agrekon*, *44*(4):543-560.

Kipkorir, D. &Kareithi, J. (2013). Indigenous Irrigation and food security in Tot Division, Kerio Valley, Kenya. *Journal of anthropology & archaeology*, *1*(1):12-27.

Kleinbooi, K. (ed.) (2011). A bulletin tracking land reform in South Africa. Umhlaba Wethu bulletin no. 13. Retrieved from www.plaas.org.za/sites/ default/files/publications-pdf/UW%2013.pdf. (accessed 15/07/2017).

Kloppers, H. J. & Pienaar G. J. (2014). The historical context of land reform in South Africa and early policies. *PER: Potchefstroomse Elektroniese Regsblad17*(2):01-32.

Koop, G. (2013*). Analysis of economic data*, 4th edition. Chichester: John Wiley & Sons.

Koopman, N. (2014). Inclusive dignity and land reform in South Africa. *Scriptura: International Journal of bible, teligion and theology in Southern Africa*, *113*(1):1-8.

Krantz, L. (2001). *The sustainable livelihood approach to poverty reduction*. Devision for policy and socio-economic analysis. Swedish international development cooperation agency.

Kumar, R. (2005). *Research Methodology*: A step-by-step guide for beginners, 2nd edition. London: Sage.

Kumar, A. & Sharma, P. (2013). Impact of climate variation on agricultural productivity and food security in rural India. *Economics Discussion Papers*, (2013-43), Kiel Institute for the World Economy.

Kumba, J.K. (2015). The role of household characteristics in determining food security in Kisii Central Sub-County, Kenya. *Research on Humanities and Social Sciences, 5*(7):186-193.

Kumba, J.K., Wegulo, F. &Otieno, J. (2015). The impact of socio-economic characteristics on cash and food crop production: implications on household food situation in Kisii Central Sub-County, Kenya. *Journal of economic development*,*6*:147-153.

Kumari, L. (2013). Poverty eradication in India: A study of national policies, plans and programs. *Researchers World*, *4*(2): 68-80.

Kuhnen, F. (1986). The causes of underdevelopment and concepts for development: An introduction to development theories. *The Journal of Development Studies*, 8:11-25.

Kumornu, J.K., Suleyman, D.M. & Amegashie, D.P. (2013). Analysis of food security status of farming households in the forest belt of Central Region of Ghana. *Russian Journal of Auricular and Socio-economic sciences, 1*(13):26-42.

Kuwenyi, S., Kabuka, F.I. & Masuku, M.B. (2014). Determinants of rural households' food security in Shiselweni Region, Swaziland: Implications for agricultural policy. *Journal of Agriculture and Veterinary Science*, 7(11):44-50.

Landes, D.S. (1998). *The wealth and poverty of nations: why some countries are so rich and some so poor.* New York: Noton.

Langat, B.K., Nyangweso, P.M., Kipsat, K.M. & Kebenei, J.S. (2011). Household food security in a commercialized subsistence economy: A case of smallholder tea famers in Nandi south district, Kenya. *Journal of Development and Agricultural Economics*, *3*(5):201-209.

Lapar, M.L.A., Binh, V.T., Son, N.T., Tiongco, M., Jabbar, M. & Staal, S. (2006). The role of collective action in overcoming barriers to market access by smallholder producers: some empirical evidence from Northern Vietnam. In *Workshop on Collective Action and Market Access for Smallholders*:2-5.

LBFP [Limpopo Basin Focal Project]. (2010). *Poverty in the Limpopo Basin*. Report submitted to the Challenge Program on Water and Food. Limpopo Province, South Africa.

Legae, A. M. (1997). *Rights to Macha vie (matlwang) village: a historical study, 1837-1991*. Potchefstroom University for Christian higher education.

Leibbrandt, M., Wegner, E. & Finn, A. (2011). *The policies for reducing income inequality and poverty in South Africa*. South Africa labour and development research unit, working paper no. 64.

Lele, U. & Agarwal, M. (1989). *Smallholder and large scale agriculture in Africa: Are there trade-offs between growth and equity?* MADIA Project. Washington, D.C.: World Bank.

Lemke, S. & Jansen van Rensburg, F. (2014). Remaining at the margins: Case study of farmworkers in the North West Province, South Africa. *Development Southern Africa, 31*(6):843-858.

Lephakga, T. (2013). The history of theologised politics of South Africa, the 1913 Land Act and its impact on the flight from the black self. *StudiaHistoriaeEcclesiasticae,39(*2):379-400.

Lepheane, T.J. (2007). Land redistribution and its impact on agri-BEE: a case study of Calcom, PTY, Barberth, Mpumalanga. Masters dissertation, Wits University, South Africa.

Lethobeng, P.A. M. (2011). Statutory *framework for land tenure reform in communal areas*, Lethobeng, North-West University: South Africa.

Liebenberg, S. (2000). Human development and human rights, South African Country Study.*Human Development Report*.

Lopez, R. (2002). Agricultural Growth and Poverty Reduction. Socioeconomic Analysis and Policy Implications of the Roles of Agriculture in Developing Countries. Roles of Agriculture Project. *Food and Agriculture Organization, Rome, Italy*.

LRPDD [Land Reform Policy Discussion Document], (2012). Land reform policy discussion document. Retrieved from http://www.anc.org.za/docs/discus/2012/landpolicyproposals_june2012g.pdf (accessed 30/08/2017).

Madziakapita, A. (2009*). An evaluation of the impact of food aid on food security: the case of Ngabu area in Malawi*. Masters dissertation, University of South Africa: South Africa.

Mafora, M.H. (2014). Socio-economic analysis of land reform projects at Elias Motsoaledi Local Municipality in the Limpopo Province of South Africa: comparing the degree of contribution to food security. Master's dissertation, University of South Africa: South Africa.

Magaña-Lemus, D., Ishdorj, A., Rosson, C.P. & Lara-Álvarez, J. (2016). Determinants of household food insecurity in Mexico. *Agricultural and Food Economics*, *4*(1):1-20.

Mahmood, S., Tabassum, A., Khan, S.A. & Jabeen, N. (2014). An Investigation of Determinants of Food Security in Rural Areas of Faisalabad, Pakistan. *Mediterranean Journal of Social Sciences*, *5*(4):676-680.

Mahuku, G., Lockhart, B.E., Wanjala, B., Jones, M.W., Kimunye, J.N., Stewart, L.R., Cassone, B.J., Sevgan, S., Nyasani, J.O., Kusia, E. & Kumar, P.L. (2015). Maize lethal necrosis (MLN), an emerging threat to maize-based food security in sub-Saharan Africa. *Phytopathology*, *105*(7):956-965.

Maitra, C. & Rao, D.P. (2015). Poverty–Food Security Nexus: Evidence from a Survey of Urban Slum Dwellers in Kolkata. *World Development*, *72*:308-325.

Makaluza, N. (2008). Capacity building for the integration of environmental planning into land reform: an assessment of a national programme. Master's dissertation, University of Western Cape: South Africa.

Malebe, G.N. (1997). Restoration of land: towards a biblical jubilee in South Africa. Master's dissertation, University of Cape Town: South Africa.

Mango, N., Zamasiya, B., Makate, C., Nyikahadzoi, K. & Siziba, S. (2014). Factors influencing household food security among smallholder farmers in the Mudzi district of Zimbabwe. *Development Southern Africa*, *31*(4):625-640.

Mannaf, M. & Uddin, M.T. (2012). Socioeconomic factors influencing food security status of maize growing households in selected areas of Bogra district. *Bangladesh Journal of Agricultural Economics*, *35*(1&2):177-187.

Maponya, P.I. (2008). *Asset portfolios food accessibility in a village in Sekhukhume, Limpopo Province*. Masters dissertation, University of South Africa.

Masekoameng, M. &Maliwichi, L.L. (2014). Determinants of Food Accessibility of the Rural Households in Sekhukhune District Limpopo Province, South Africa. *Journal of human ecology,47*(3):275-283.

Mashamaite, K.A. (2014). *The contribution of smallholder subsistence agriculture towards rural household food security in Maroteng villeage, Limpopo Province*. Masters dissertation, University of Limpopo, Turfloop campus, South Africa.

Mason, R., Ndlovu, P., Parkins, J.R. & Luckert, M.K. (2015). Determinants of food security in Tanzania: gendered dimensions of household headship and control of resources. *Agriculture and Human Values*, *32*(3):539-549.

Masuku, M.M. (2013). *The effects of infrastructural and institutional services on food security in Ntambanana rural area*. Masters dissertation, University of Zululand, South Africa.

Matchaya, G. &Chilonda, P. (2012). Estimating effects of constraints on food security in Malawi: policy lessons from regressions quantiles. *Applied econometrics and international development*, *12*(2):165-191.

Mbuli, B.N. (2008). Poverty reduction strategies in South Africa. Masters dissertation, University of South Africa, South Africa.

Mbwana, H.A., Kanab, J., Lambert, C. & Biesalski, H.K. (2016). Determinants of household dietary practices in rural Tanzania: Implications for nutrition interventions. *Cogent Food & Agriculture*, *2*(1):1224046.

Mensah, C. (2014). *The impact of livelihood diversification on food security among farm households in northern Ghana: a case study of bole district*. Masters dissertation, University of Cape Town: South Africa.

Meyer, N.G., Breitenbach, M.C., Fe´nyes, T. & Jooste, A. (2009). The economic rationale for agricultural regeneration and rural infrastructure investment in South Africa. *Journal of development perspectives, 3*(1):74–105.

Michaelsen, K.F., Hoppe, C., Roos, N., Kaestel, P., Stougaard, M., Lauritzen, L., Mølgaard, C., Girma, T. & Friis, H. (2009). Choice of foods and ingredients for moderately malnourished children 6 months to 5 years of age. *Food and nutrition bulletin*, *30*:343-S404.

Mitiku, A., Fufa, B. & Tadese, B. (2012). Empirical analysis of the determinants of rural households' food security in Southern Ethiopia: the case of Shashemene District. *Journal of Agricultural science and review, 1*(6):132-138.

MLM [Mbizana Local Municipality, IDP]. (2014), Mbizana Local Municipality Integrated Development retrieved from: file:///C:/Users/vusi/Desktop/EC443%20Mbizana%20IDP%20FINAL%202014-15.pdf (accessed 20/09/2016).

MLMSER & O [Mbizana Local Municipality Socio-Economic Review & Outlook]. (2017). *Mbizana local municipality socio-economic review and outlook: Eastern Cape Socio-Economic Consultative Council*.

Modise, L. & Mtshiselwa, N. (2013). The Natives Land Act of 1913 engineered the poverty of black South Africans: A historico-ecclesiastical perspective. *Studia Historiae Ecclesiasticae,39*(2):359-378.

Mokgupi, K. W. (2015). *The emergence and development of the Balemirui Project in the North West Province: insights into prospects and challenges of land reform in South Africa*. Masters dissertation, University of South Africa, South Africa.

Moller, W. & Amons, R. (1985). Phosphate-binding sequences in nucleotide-binding proteins. *FEBS letters, 186*(1):1-7.

Mondal, W.I. (2009). Poverty alleviation and microcredit in Sub-Saharan Africa. *International business and economics research Journal*, *8*(1):1-10.

Moreda, T. (2012). *Vulnerability, land, livelihoods and migration nexus in rural Ethiopia: A case study in South Gondar Zone of Amhara Regional State*. Doctoral Research Design, International Institute of Social Studies, the Hague, the Netherlands. http://www.iss.nl/fileadmin/ASSETS/iss/Documents/PhD_Abstracts_and_theses/shegro_RESEARCH_ DESIGN.pdf (accessed 15 March 2016).

Motbainor, A., Worku, A. & Kumie, A. (2016). Level and determinants of food insecurity in East and West Gojjam zones of Amhara Region, Ethiopia: a community based comparative cross-sectional study. *BMC Public Health*, *16*(1):1-13.

Motbainor, A., Worku, A. & Kumie, A. (2016). Stunting is associated with food diversity while wasting with food insecurity among under five children in East and West Gojjam Zones of Amhara Region, Ethiopia, 10(8):p.e0133542.

Moyo, T. &Machethe, C.L. (2016). The Relationship between Smallholder Irrigation and Household Food Availability and Dietary Diversity in Greater Tzaneen Municipality of Limpopo Province, South Africa. *Journal of Sustainable Development*, *9*(4):165.

Muchabaiwa, H. (2013). *Logistic regression to determine significant factors associated with share price change*. Master's dissertation, University of South Africa, South Africa.

Muche, M. &Tadele, E. (2015). Analysis of household level determinants of food security in Jimma Zone, Ethiopia. *Journal of Economics and Sustainable Development, 6*(9):ISSN 222-2855.

Mudefi, R. A. (2011). *Fast track land reform programmes and household food security: case of Mutare district* (Zimbabwe).

Muhoyi, E., Mukura, T.J., Ndedzu, D., Makova, T. & Munamati, O. (2014). Determinants of household food security in Murehwa District, Zimbabwe. *Journal of Economics and Sustainable Development*, *5*(3):84-92.

Muniruzzaman, A.N.M. (2013). Food Security in Bangladesh: A Comprehensive Analysis. *Peace and Security Review, 5*(1):46-73.

Murray, C. & Williams, G. (1994). Land and freedom in South Africa*: review of African political economy, 21*(61):315-324.

Muruviwa, A.T. (2011). *Livelihood strategies of the aged people in Mubaira community, Zimbabwe*. Masters dissertation, University of Fort Hare, South Africa.

Musemwa, L., Zhou, L. & Aghdasi, F. (2013). Factors affecting household access to enough food in the Eastern Cape Province of South Africa. *Journal of Development and Agricultural Economics*, *5*(3):84-91.

Mustapha, S., Mohammed, T. & Abdul Fatahi, A. (2016). Determinants of Household Food Insecurity in Northern Ghana: An Ordered Probit Approach. *Journal of Economics and Sustainable Development, 7*(16):27-37.

Muyanga, M. & Jayne, T.S. (2014). Effects of rising rural population density on smallholder agriculture in Kenya. *Food Policy*, *48*: 98-113.

Mwakanyamale, D.F., Mkamilo, G.S., & Kimata, B.P. (2015). Contribution of sweet potato (Ipomoea batatas) to household food security among farmers in Kilosa District, Tanzania. *African Journal of Crop Science 3*(6):183-189.

Nafziger, E.W. (2012). *Economic development*, 5th edition. Cambridge University Press.

Nata, J.T., Mjelde, J.W. & Boadu, F.O. (2014). Household adoption of soil-improving practices and food insecurity in Ghana. *Agriculture & Food Security*, *3*(1):1-7.

Nchuchuwe, F.F. & Adejuwon, K.D. (2012). The challenges of agriculture and rural development in Africa: the case of Nigeria. *International Journal of academic research in progressive education and development*, *1*(3):45-61.

Ndhleve, S., Musemwa, L. & Zhou, L. (2012). Household food security in a coastal rural community of South Africa: Status, causes and coping strategies. *Journal of agricultural biotechnology and sustainable development*, *4*(5):015-020.

Ndobo, F. & Sekhampu, T.J. (2013). Determinants of vulnerability to food insecurity in a South African township: A gender analysis. *Mediterranean Journal of social sciences*, *4*(14):311–317.

Nezic, D., Borzanovic, M., Spasic, T. & Vukovic, P. (2013). Calibration of the EuroSCORE II risk stratification model: is the Hosmer–Lemeshow test acceptable anymore? *European Journal of Cardio-Thoracic Surgery*, *43*(1):206-206.

Ngongi, A.M. &Urassa, K. (2014). Farm households food production and households' food security Status: A Case of Kahama District, Tanzania. *Tanzania Journal of agricultural sciences*, *13*(2):40-58.

Ngowi, H.P. (2009). Economic development and change in Tanzania since independence: The political leadership factor. *African Journal of political science and international relations*, *3*(5):259-267.

Ngugi, M., Mumiukha, C., Fedha, F. & Ndiga, B. (2015). Universal primary education in Kenya: Advancement and Challenges. *Journal of Education and Practice*, *6*(14):87-95.

Nieburg, P. (2012). Improving maternal mortality and other aspects of women's health. *Washington, DC: Center for strategic and international studies*.

Nishimura, M., Yamano, T. & Sasaoka, Y. (2008). Impacts of the universal primary education policy on educational attainment and private costs in rural Uganda. *International Journal of Educational development*, *28*(2):161-175.

Njuki, J. & Sanginga, P.C. (2013). *Women, livestock and markets: bridging the gender gap in Eastern and Southern Africa*. London: Routledge.

Nkondze, M.S., Masuku, M.B. & Manyatsi, A. (2013) Factors affecting households' vulnerability to climate change in Swaziland: A case of Mpolonjeni area development programme. *Journal of Agricultural Science, 5*(10):108-122.

Nugusse, W.Z., Van Huylenbroeck, G. & Buysse, J. (2013). Household food security through cooperatives in Northern Ethiopia. *International Journal of cooperative studies*, *2*(1):34-45.

Nyikahadzoi, K., Zamasiya, B., Muchinako, G.A. & Dziro, C. (2013). Enhancing social support system for improving food security among the elderly-headed household in communal areas of Zimbabwe. *Journal of food research, 2*(3), 46–54.

Obayelu, O.A. &Onasanya, O.A. (2016). Determinants of food security status of maize-based farming households in Southern Guinea Savannah area of Oyo State, Nigeria. *Turkish Journal of agriculture-food science and technology*, *4*(5):411-417.

Obayelu, O.A. & Orosile, O.R. (2015). Rural livelihood and food poverty in Ekiti State, Nigeria. *Journal of agriculture and environment for international development*, *109*(2):307-323.

Obeng-Odoom, F. (2013). Africa's failed economic development trajectory: a critique. *African review of economics and finance, 4*(2):151-175.

Obisesan, A.A., Akinlade, R.J. & Fajimi, F.O. (2013). Determinants of fertiliser use among smallholder food crop farmers in Ondo State, Nigeria. *American Journal of research communication*, *1*(7):254-260.

Obuoyo, J.A., Ochola, C.O. & Ogindo, H. (2016). Livestock for household food security: A case study of small-scale mixed farmers in Semi-Arid Nyakach, Kenya. *International Journal of livestock research*, *6*(1):57-67.

Ogato, G.S. (2013). The quest for gender equality and women's empowerment in least developed countries: Policy and strategy implications for achieving millennium development goals in Ethiopia. *International Journal of Sociology and Anthropolog, 5*(9):358-372.

Ojeleye, O.A., Adebisi, O.A. & Fadiji, T.O. (2014). Assessment of farm household food security and consumption indices in Nigeria. *Asian Journal of agriculture and rural development*, *4*(9):458-464.

Ojo, E.O. & Adebayo, P.F. (2012). Food security in Nigeria: an overview. *European Journal of Sustainable Development, 1*(2):199-221.

Ojo, C.O. &Babayo, U.A. (2013). Analysis of gender contribution to rural household food supply: A case study of Askira/Uba local government area, Borno State. *Greener Journal of agricultural sciences,3*(3):240-245.

Olagunju, F.I., Oke, J.T.O., Babatunde, R.O. & Ajiboye, A. (2012). Determinants of food insecurity in Ogbomoso Metropolis of Oyo State, Nigeria. *Production, agriculture technology Journal, 8*(1):111-124.

Oluyole, K.A., Oni, O.A., Omonona, B.T. & Adenegan, K.O. (2009). Food security among cocoa farming households of Ondo State, Nigeria. *Journal of agricultural and biological science*, *4*(5):7-13.

Omer-Cooper, J.D. (2000). *History of South Africa*. 2nd ed. London: Currey.

Omideyi, A.K. (2007). Poverty and development in Nigeria: Trailing the MDGs? *African Journal of Infectious Diseases*, *1*(1):3-17.

Omotesho, O.A., Adewumi, M.O., Muhammad-Lawal, A. & Ayinde, O.E. (2006). Determinants of food security among the rural farming households in Kwara State, Nigeria. *African Journal of general agriculture, 2*(1):7–15.

Omotesho, O.A., Adewumi, M.O. & Fadimu, K.S. (2007). *Food security and poverty of the rural households in Kwara State, Nigeria.* Conference proceedings (2007):571-575.

Omotesho, O.A., Adewumi, M.O. & Fadimula, K.S. (2010). Food security and poverty of the rural households in Kwara State, Nigeria. *Libyan agriculture research center Journal international*, *1*(1):56-59.

Omotesho, K.F., Muhammad-Lawal, A. & Ismaila, D.E. (2014). Assessment of hired labour use and food security among rural farming households in Kwara state, Nigeria. *Journal of Agricultural Sciences*, *59*(3):353-361.

Oyebanjo, O., Ambali, O.I. & Akerele, E.O. (2015). Determinants of food security status and incidence of food insecurity among rural farming households in Ijebu division of Ogun State Nigeria. *Journal of agricultural science and environment*, *13*(1):92-103.

Paarlberg, R. & Paarlberg, R.L. (2013). *Food politics: What everyone needs to know*, Oxford University Press.

Parsavala, S., DorostyMotlagh, A., DaneshiMaskooni, M., Eshraghian, M. & Siassi, F. (2013). Food insecurity and some associated socioeconomic factors among high school girls of Tehran. *International research Journal of applied basic science*, *7*(8):508-511.

Philander, F.R. (2015). *An appraisal of urban agriculture as a livelihood strategy for household food security: a case study of urban food gardens in Ward 51, Langa, Cape Town*. Master's dissertation, University of Western Cape, South Africa.

Phogole, M. (2010). *Issues of increasing levels of poverty and hunger in Africa, with specific reference to South Africa*. Policy brief 2010, briefing no. 8: Pretoria: AISA.

Pillay, P. (2011). *Higher education and economic development*. Wynberg, South Africa. Published by the Centre for higher education transformation.

Pingali, P., Stamoulis, K. & Stringer, R. (2006). Eradicating extreme poverty and hunger: towards a coherent policy agenda. *The development dimension trade, agriculture and development policies working together: Policies working together*, *167*.

Pinstrup-Andersen, P. (2009). Food security: definition and measurement. *Food security, 1*(1):5-7.

Porter, J.X., Xie, L., Challinor, A.J., Chochrane, K., Howden, S.M., Iqbal, M.M., Lobell, D.B. & Travasso, M.I. (2014). Food security and food production systems. Cambridge University Press, Cambidge, United Kingdom, and New York:485-533.

Prakash, J. (2015). Consumption Trends of Processed Foods among Rural Population Selected from South India. *Ommega Internationals*, *2*(6):1-8.

Pulkstenis, E. & Robinson, T.J., 2002.Two goodness-of-fit tests for logistic regression models with continuous covariates. *Statistics in medicine*, *21*(1):79-93.

Purvis, M. & Smith, R. (2006). Sustainable agriculture for the 21st century. In *exploring sustainable development: geographic perspectives*. London: Earth-scan.

Rakib, M.A., Akter, M.S. & Hossain, M.B. (2014). Extreme events (flood & drought) and food security measures in the aspects of local perception. *American Journal of agriculture and forestry*, *2*(4):183-191.

Ramakrishna, G., Gaddam, S.R. & Daisy, I. (2014). Impact of floods on food security and livelihoods of IDP tribal households: the case of Khammam region of India. *International Journal of development and economics sustainability, 2*(1):11-24.

Rasugu, D. (2014). *Promote gender equality and empower women: the big picture*. Retrieved from phttp://digitalcollections.sit.edu/capstones/2777 (accessed 2/04/2017).

RDP [Reconstruction Development Programme]. (1994). The reconstruction development programme. South African Government.

Regmi,M., Paudel, K.P. & Mishra, A. (2016). Impact of remittances on food security in Bangladesh. *Food security in a food abundant world (Frontiers of economics and globalization).* Emerald group publishing Limited*, 16*:145–158.

Renzaho, A.M. & Mellor, D. (2010). Food security measurement in cultural pluralism: missing the point or conceptual misunderstanding? *Nutrition, 26*(1):1-9.

Richardson, R.B. (2010). Ecosystem services and food security: economic perspectives on environmental sustainability. *Sustainability*, *2*(11):3520-3548.

Runge, C.F., Senauer, B., Pardey, P.G. & Rosegrant, M.W. (2003). *Ending hunger in our lifetime: food security and globalization*. Baltimore: John Hopkins University Press.

Rugege, S. (2004). Land Reform in South Africa: an overview. *International Journal of Legal Information*,*32*(283):1-28.

Rungasamy, L. (2011). *The need for settlement support in land reform projects: focus on sustainable development*. Master's dissertation, University of South Africa, South Africa.

Sahn, D.E., Dorosh, P.A. & Younger, S.D. (1997). *Structural adjustments (economic policy)-Africa, Sub-Saharan*, Cambridge University Press.

Saka, J.O., Okoruwa, V.O., Oni, O.A. & Oyekale, A.S. (2011). The structure and determinants of land-use intensity among food crop farmers in Southwestern Nigeria. *Journal of agricultural science*, *3*(1): 194-204.

Sakyi, P. (2012). *Determinants of food accessibility of rural households in the Limpopo province: South Africa.* Masters dissertation, Gahent University, Belgium.

Sandkjaet, B. (2009). Foreword: HIV/AIDS and African Sustainable Development. *International Journal of semantic computing*, *3*(1):1-22.

Sani, J.M.M., Mansor, I.M., Nasir, S.M. & Mahir, A.A. (2014). The impact of non-farm income generating activities on the food security status of rural households in Nigeria. *International Journal of agricultural sciences and veterinary medicine, 2*(4):2320-3730.

Santos, M., Lugo, M., Lopez, C.G., Cruces, G. & Battiston, D. (2010). Refining the basic needs approach: a multi-dimensional analysis of poverty in Latin America. *Research on economic inequality, studies in applied welfare analysis: papers from the third ECINEQ meeting, 18*:1-29.

Sarracino, F. (2010). Explaining famines: a critical review of main approaches and further causal factors. *Sassi Maria: International working paper, series no. 10/02.*

Sasson, A. (2012). Food security for Africa: An urgent global challenge. *Agriculture & food security, 1*(1):1–16.

Scanlan, S.J. (2001). Food availability and access in lesser-industrialized societies: A test and interpretation of neo-Malthusian and technoecological theories. In *Sociological Forum*, 16(2):231-262.

Scanlan, S.J. (2003). Food security and comparative sociology: Research, theories, and concepts. *International Journal of sociology*,*33*(3):88-111.

Schmidhuber, J. & Tubiello, F.N. (2007). Global food security under climate change. *Proceedings of the national academy of science, 104*(50):19703-19708.

Scoones, I. (1998). Sustainable rural livelihoods: a framework for analysis. IDS working paper no. 72. Institute of development studies, Brighton.

Sekhampu, T.J. (2013). Determinants of the Food Security Status of Households Receiving Government Grants in Kwakwatsi, South Africa. *Mediterranean Journal of social sciences*, *4*(1):147-153.

Selepe, B.M. & Mtyingizane, S.S. (2015). Factors contributing to household food insecurity in Mhlontlo area, Eastern Cape, South Africa. *Journal of Hospitality and Management. Tourism*, *and leisure 4*(1): 2223-814X.

Sen, A. (1981). *Poverty and famines: an essay on entitlement and deprivation*. Oxford University Press, Oxford, UK.

Sewnet, Y. (2015). Causes and coping mechanisms of food insecurity in rural Ethiopia. *Agriculture and biology Journal of North America, 6*(5):123-133.

Sherbinin, A.D., Carr, D., Cassels, S. & Jiang, L., 2007. Population and environment. *Annual review of environment and resources,32*:345-373.

Sichoongwe, K., Mapemba, L., Tembo, G., & Ng'ong'ola, D. (2014). The determinants and extent of crop diversification among smallholder farmers: a case study of Southern Province, Zambia, *Journal of Agricultural Science, 6*(11):150-159.

Silvesri, S., Sabine, D., Patti, K., Wiebke, F., Maren, R., Ianetta, M., Carlos, Q.F., Mario, H., Anthony, N., Nicolas, N. & Joash, M. (2015). Households and food security: lessons from food secure households in East Africa. *Agriculture and food security*, *4*(1):1-15.

Simmonds, S. (2014). Curriculum-making in South Africa: promoting gender equality and empowering women. *Gender and education,* 26(6):636-652.

Smith, G. (2004). US Aid to Africa. *Review of African political economy, 31*(102):698-703.

Smith, M.K. (2012). *Dynamics affecting subsistence agricultural production: an exploration of a case study of subsistence crop production within a rural community in the Ingwe municipality of Southern KwaZulu-Natal*. Durban: University of KwaZulu-Natal, South Africa.

Siphambe, H.K. (2003). Dimensions and measures to reduce poverty in Botswana, Pula: *Botswana Journal of African studies*,*17*(2):19-25.

Spark, A. (2007). Nutrition in public health: Principles, policies and practice. United States of America: CRC Press.

Srivastava, M.P. (2013). Plant clinic towards plant health and food security. *International Journal of phytopathology*, *2*(3):193-203.

Stat. SA [Statistics South Africa]. (2013). Millennium development goals report. South African statistics. Statistic South Africa, Pretoria.

Stewart, W.M. & Roberts, T.L. (2012). Food security and the role of fertiliser in supporting it. *Procedia Engineering*, *46*:76-82.

Stock, R. (2012). *Africa South of the Sahara: a geographical interpretation*. Guilford Press, NYC, NY.

Sultana, A. &Kiani, A. (2011). Determinants of food security at household level in Pakistan. *African Journal of business management*, *5*(34):12972.

Taruvinga, A., Muchenje, V. & Mushunje, A. (2013). Determinants of rural household dietary diversity: The case of Amatole and Nyandeni districts, South Africa. *International Journal of Development and Sustainability*, *2*(4):1-15.

Tefera, T. & Tefera, F. (2014). Determinants of households' food security and coping strategies for food shortfall in Mareko District, Guraghe Zone, Southern Ethiopia. *Journal of food security, 2*(3):92-99.

Tekle, L. &Berhanu, K. (2015). Determinants of rural farm household food security in Boloso, Sore District of Wolaita Zone in Ethiopia. *Asian Journal of Agricultural Extension, Economics and Sociology*, *5*(2):57-68.

Tembwe, G. (2010). *Diet diversity coping strategies and food access of unemployed young single mother with children under 9 years of age in Botswana*. Masters dissertation, University of South Africa, South Africa.

Thomas, P.Y. (2010). Towards developing a web-based blended learning environment at the University of Botswana. Master's dissertation, University of South Africa: South Africa.

Tibesigwa, B. &Visser, M. (2015). Small-scale subsistence farming, food security, climate change and adaptation in South Africa: Male-female headed households and urban-rural nexus. *Cape Town: Economic Research Southern Africa*.

Tollman, S. (1984). *Thoughts on planning for basic needs in South Africano. 9*. SALDRU, School of Economics, University of Cape Town.

Twala, C. (2012). The impact of rural development on poverty reduction in a post-apartheid South Africa: an ecological discourse. *Journal of human ecology, 40*(3):213-221..

Tsawu, S. (2006). An historical overview and evaluation of the sustainability of the land distribution for agriculture development programme in South Africa. Master's dissertation, Stellenbosch University: South Africa.

UN [United Nations] (2010). *Education for all global monitoring report, 2010: reaching the marginalized,* UNESCO and Oxford University Press. Paris and London.

UN [United Nations]. (2012). The millennium development goals report 2012. Retrieved from http://www.un.org/millenniumgoals/reports.shtml (Accessed 04/03/2017).

UN [United Nations]. (2013). We can end poverty: Millinium Development Goals and beyond 2015. The Millennium Development Goals Report 2013, United Nations; MDG Gap Task Force Report 2013, DESA, Good Practices and Innovations in Public Governance; UNESCO; International Monetary Fund, World Bank.

UN [United Nations]. (2014). *Sustainable development indicator framework for Africa and initial compendium of Indicators*. United Nations Economic Commission for Africa: Addis Ababa, Ethiopia.

UNICEF [United Nations Children's Fund]. (2010). *Levels & Trends in Child Mortality: Report 2010: Estimates Developed by the UN Inter-Agency Group for Child Mortality Estimation*. United Nations Children's Fund.

Usman, M. (2015). An assessment on effect of adoption of small scale irrigation technologies by fadama users in agricultural zone III of Niger State, Nigeria. *Journal of agriculture and ecology research international, 3*(2):59-66.

Valente, C. (2009). The food (in)security impact of land redistribution in South Africa: micro-econometric evidence from national data. *World development*, *37*(9):1540-1553.

Van Niekerk, A. (2005). *Ethics in Agriculture: An African Perspective*. Dordrecht: Springer.

Verter, N. &Becvarova, V. (2014). Yam production as pillar of food security in Logo Local Government Area of Benue State, Nigeria. *European scientific Journal, 10*(31):27–42.

Viterna, J. & Robertson, C. (2015). New directions for the sociology of development. *Annual review of sociology*, *41*:243-269.

Weidman, M. (2004). A history of dispossession. Retrieved from http://wiredspace.wits.ac.za/bitstream/handle/10539/275/13_chapter1.pdf?sequence=13 (Accessed 3 November 2017).

Westaway, A. (2012). Rural poverty in the Eastern Cape Province: Legacy of apartheid or consequence of contemporary segregationism? *Development Southern Africa*, *29*(1):115-125.

WHO [World Health Organization] (2003). *Diet, nutrition and the prevention of chronic diseases*. World health organisation: Geneva, Switzerland. Retrieved from

http://apps.who.int/iris/bitstream/10665/42665/1/WHO_TRS_916.pdf (accessed 19/07/2017).

WHO [World Health Organization] (2014). *To improve maternal health, barriers that limit access to quality maternal health services must be identified and addressed at all levels of the health system: factsheet*. Geneva: WHO, 2014. Retrieved from http://apps.who.int/iris/handle/10665/ 112318 (Accessed 10/06/2017).

Yusuf, S.A., Balogun, O.L. & Falegbe, O.E. (2015). Effect of urban household farming on food security status in Ibadan metropolis, Oyo State, Nigeria. *Journal of agricultural sciences*, *60*(1):61-75.

Zakari, S., Ying, L. & Song, B. (2014). Factors influencing household food security in West Africa: The case of Southern Niger. *Sustainability*, *6*(3):1191-1202.

Zhanda, R.M. (2014*). An investigation into land reform, gender and welfare in South Africa*. Master's dissertation, Stellenbosch University, South Africa.

Zhang Z. (2016). Model building strategy for logistic regression: purposeful selection. *Ann Transl Med, 4*(6):111.

Ziervogel, G. & Ericksen, P.J. (2010). Adapting to climate change to sustain food security. *Wiley inter-disciplinary reviews: climate change, 1*(4):520-540.

Ziervogel, G. & Frayne, B. (2011). *Climate change and food security in Southern African cities*. Urban food security series no. 8. Queen's University and AFSUN: Kingston and Cape Town.

Zithutha, M. W. (2010). *An assessment of the role of small-scale farming in reducing poverty in Kanyayo, Bizana District, Eastern Cape*. Faculty of Humanities and Social Sciences, University of KwaZulu-Natal, South Africa.

Zuberi, T. and Thomas, K.J.A. (2012) *Demographic projections, the environment and food security in Sub-Saharan Africa*. Working Paper 2012-001. United Nations Development Programme Regional Bureau for Africa, New York, New York.

APPENDICES

APPENDIX A: ENGLISH QUESTIONNAIRE

INTERVIEW / OBSERVATION SCHEDULE ON HOUSEHOLD FOOD SECURITY 2016

Name of interviewer	

Date of interview		Questionnaire number:	

RESPONDENT DETAILS

1.. Respondent details

Name of respondent		Gender	Male	Female
Contact cell number		Age		

2. Relationship to the household head (eg mother/father):……

3. Household location details

Household location	Ward number:

HOUSEHOLD HEAD DETAILS

4. Gender of the household head

Male		Female	
01		02	

5. What is the age of the household head:……

6. What is the highest level of education achieved by the household head?

Never attended formal education		Some primary		Some secondary		Tertiary education	
01		02		03		04	

7. Marital Status of the household head

Never married		Married		Divorce/separated		Widow	
01		02		03		04	

8. Employment status of the household head

Full time		Self employed		Part time		Seasonal		unemployed	
01		02		03		04		05	

9. Not working because of a reason? Please specify:……

10. What is the occupation of the household head if working:…….....

11. Health status (self-reported)

Good		Poor		I do not know		I am not sure		Not Applicable	

HOUSEHOLD DETAILS

12. How many household members residing in this homestead including the head?.....

13. How many school going children live in your house? ……

14. How many household members in each category?

Age category	No. of household members in each category
0-14	
15-39	

40-64	
65+	

15. How many household members are permanently employed and how many part time?

Type	Number
Permanent/full time	
Part time	
Total number employed	

16. Anyone in the household who collect any type of the following grants?

Type of grant	Yes	No	Number of recipients
Aged			
Disabled			
Child support			
Foster care			
Other type of social grant			

17. Any other sources of household income/remittances?

Yes		No	
01		02	

18. How much money per month does the household receive from different sources (any form of income such as wages, salaries or remittances)?…….……..……..…

19. Which income category closest resembles your average estimated household income per month?

Income	
No income	
R1 to R400	
R401 to R800	
R801 to R1 600	
R1 601 to R3 200	
R3 201 to R6 400	
R6 401 to R12 800	
R12 801 to R25 600	
R25 601 to R51 200	
No response/ not sure	

20**. Does anyone in the household own any of the following?**

Items	Yes	No
Working radio		
Working fridge		
Working bicycle		
Working television		
Working car/truck		
Working telephone		
Working cell phone		

Working electric stove		
Working sewing machine		
Working microwave		
Working DVD machine		
Working computer		
Working washing machine		
Working camera but not in a cell phone		

SERVICES AND INFRASTRUCTURE

21. What is the main source of water for this homestead?

Main water source	Tick
Pipe water in dwelling	
Pipe water in yard	
Pipe water, public tap	
Borehole	
River/stream/well	
Protected spring	
Other (specify): (eg water kiosk, tanker, from nearby house	

22. What type of sanitation (toilet facility) is available on the site of this homestead? (Mark only one)

Type of sanitation	Tick
Full waterborne flush toilet (off-site disposal)	
Septic tank (on site disposal)	
Ventilated improved Pit Latrine	
Basic Pit Latrine	
Chemical toilet	
No facility	
Other (specify)	

23. Do you have access to electricity at this homestead?

Yes	
No	

24. What energy source is mostly used at this homestead for cooking? (Mark only one)

Energy source for cooking	Tick
Electricity (Eskom or local authority)	
Electricity (Solar)	
Electricity (Generator)	
Gas	
Paraffin	
Wood	
Coal	
Dung	
Other (specify)	

25. What energy source is mostly used for at this homestead for lighting? (Mark only one)

Energy source for cooking	Tick

Electricity (Eskom or local authority)	
Electricity (Solar)	
Electricity (Generator)	
Gas	
Paraffin	
Candles	
Other (specify)	

26. How many minutes you walk to the main road? .....……

AGRICULTURAL ACTIVITIES

27. Do you keep any livestock?

Yes	
No	

28. If yes, what livestock do you keep? For what purpose do you keep livestock for?

29. If no, why you do not keep livestock?

30. Do you grow any crops during the year?

Yes	1
No	0

31. If yes, what kind of crops you grow?

32. Do you grow any fruit and/or vegetables?

Fruit/Vegetables	Yes	No
Fruit		
Vegetables		

33. If you grow any fruit, what do you grow?

34. If you grow any vegetables, what do you grow?

35. If you do not grow any crops/vegetables/fruit indicate the reason (s) why not?

36. If you produce crops/fruits/vegetables, do you sell any of it?

Yes	
No	

37. If you do sell, explain what and how much you sell?

38. Do you use any of the following in your farm?

Inputs/resources	Yes	No
Improved seeds		
Fertiliser		
Irrigation		
Agricultural extension serves		
NGOs support for agro-business		
Government support for agro-business		
Access credits for your farming		
Have you leased out your land to cooperatives or other people?		

39. What contribution the farming has on household monthly income?

40. Do you have access to the market for selling?

Yes	
No	

41. How many minutes to reach the market where you sell your produce? ……

42. Are you part of the land restitution programme?

Yes	
No	

43. If yes what are the benefits of being part of the program?

44. If yes, what are the challenges you face as a land reform beneficiary?

45. Who in the household does the farming?

46. If you as the household head work on the farm, how many hours per week do you spend on farming? ……...

47. How many years the household head engaged in farming? ……

48. What kind of support would you like the government to provide for you to improve your farming output?

49. Does the following happen to you?

	Yes	No
Are you part of the savings club?	1	0
Does your savings club membership help you to finance your farming?	1	0
Do droughts or floods have an impact on chances of not getting enough food?	1	0
Do diseases and insects affect your farm production?	1	0
Are you a member of any agricultural cooperative?	1	0
Has your cooperative made a difference in your life	1	0
Can you access more land through your traditional leader?		

50. In which month do you have plenty crops from your farm?

	J	F	M	A	M	J	J	A	S	O	N	D
Plenty												
Some												
Nothing												

51. In which month do you have plenty vegetables from your farm?

	J	F	M	A	M	J	J	A	S	O	N	D
Plenty												
Some												
Nothing												

52. In which month do you experience food shortage?

J	F	M	A	M	J	J	A	S	O	N	D

ACCESS TO FOOD

53. Where do you get the food you consume?

Type of the place	Yes	No
Market		
Shops		
Food Aid (government)		
Food Aid (private)		
Own production		

Local trades/vanders		

FOOD SECURITY

54. Availability of food in the household during the past 30 days

Strategy/frequency	Never	Rarely (once/ twice in the past 30 days)	Sometimes (three to ten times in the past 30 days)	Often (more than ten times in the past 30 days)
Did you worry that your household would not have enough food? If yes how often did this happen?	0	1	2	3
Were you or any household member not able to eat the kinds of foods you preferred because of a lack of resources? If yes how often did this happen?	0	1	2	3
Did you or any household member have to eat a limited variety of foods due to a lack of resources? If yes how often did this happen?	0	1	2	3
Did you or any household member have to eat some foods that you really did not want to eat because of a lack of resources to obtain other types of food? If yes how often did this happen?	0	1	2	3
Did you or any household member have to eat a smaller meal than you felt you needed because there was not enough food? If yes how often did this happen?	0	1	2	3
Did you or any other household member have to eat fewer meals in a day because there was not enough food? If yes how often did this happen?	0	1	2	3
Was there ever no food to eat of any kind in your household because of lack of resources to get food? If yes how often did this happen?	0	1	2	3
Did you or any household member go to sleep at night hungry because there was not enough food? If yes how often did this happen?	0	1	2	3
Did you or any household member go a whole day and night without eating anything because there was not enough food? If yes how often did this happen?	0	1	2	3

55. Please describe the foods (meals and snacks) that the household ate or drink yesterday during the day and night, at home and outside the home. (24hr recall)

Breakfast (food and beverages)

Lunch (food and beverages)
Supper (food and beverages)

56. Dietary diversity list (24hr recall)

Question number	Food group	Examples	YES=1 NO=0
1	Cereals	corn/maize, rice, wheat, sorghum, millet or any other grains or foods made from these (e.g. bread, noodles, porridge or other grain products) + *insert local foods e.g. ugali, nshima, porridge or paste*	
2	White roots and tubers	white potatoes, white yam, white cassava, or other foods made from roots	
3	Vitamin a rich vegetables and tubers	pumpkin, carrot, squash, or sweet potato that are orange inside + *other locally available vitamin A rich vegetables (e.g. red sweet pepper)*	
4	Dark green leafy vegetables	dark green leafy vegetables, including wild forms + *locally available vitamin A rich leaves such as amaranth, cassava leaves, kale, spinach*	
5	Other vegetables	other vegetables (e.g. tomato, onion, eggplant) + *other locally available vegetables*	
6	Vitamin a rich fruits	ripe mango, cantaloupe, apricot (fresh or dried), ripe papaya, dried peach, and 100% fruit juice made from these + *other locally available vitamin A rich fruits*	
7	Other fruits	other fruits, including wild fruits and 100% fruit juice made from these	
8	Organ meat	liver, kidney, heart or other organ meats or blood-based foods	
9	Flesh meats	beef, pork, lamb, goat, rabbit, game, chicken, duck, other birds, insects	
10	Eggs	eggs from chicken, duck, guinea fowl or any other egg	
11	Fish and seafood	fresh or dried fish or shellfish	
12	Legumes, nuts and seeds	dried beans, dried peas, lentils, nuts, seeds or foods made from these (e.g. hummus, peanut butter)	
13	Milk and milk products	milk, cheese, yogurt or other milk products	
14	Oils and fats	oil, fats or butter added to food or used for cooking	
15	Sweets	sugar, honey, sweetened soda or sweetened juice drinks, sugary foods such as chocolates, candies, cookies and cakes	
16	spices, condiments, beverages	spices (black pepper, salt), condiments (soy sauce, hot sauce), coffee, tea, alcoholic beverages	

APPENDIX B: XHOSA QUESTIONNAIRE

UPHANDO NGOKUTYA NGONYAKA KA 2016

Igama lomntu owenza undliwano-ndlebe (interviewer)	

Usuku lodliwano-ndlebe (date of interview)		Iphepha lemibuzo (questionnaire nr):	

INKCUKACHA ZEKHAYA KUNYE NOMNTU OPENDULA IMIBUZO

1. Inkcukacha zomntu opendula imibuzo xa engeyiyo intloko yekhaya (respondent details)

Igama lomntu ophendula imibuzo		Isini	Indoda		Ibhinqa	
Inombolo yefowuni		Iminyaka				

2. Uyintono kwintloko yekhaya (umzekelo, ngumama okanye ngutata):……

3. Iinkcukaca zendawo ohlala kuyo

Indawo ohlala kuyo	Iwadi namba (ward number):

INKCUKACHA ZENTLOKO YEKHAYA

4. Isini sentloko yekhaya

Indoda		Ibhinqa	
1		0	

5. Ineminyaka emingaphi intloko yekhaya? …….

6. Leliphi ibanga lemfundo elaphunyelelwa yintloko yekhaya kula angezantsi?

Andikaze ndiye esikolweni		Amabanga aphantsi		Amabanga aphakemeyo		Ibanga leshumi nangaphezulu	
01		02		03		04	

7. Isimo somtshato

Andikaze nditshate		Nditshatile		Ndaphuma emtshatweni		Ndingumhlolokazi	
01		02		03		04	

8. Isimo somsebenzi kwintloko yekhaya

Ndiqashwe ngokupheleloyo		Ndiyazisebenza		Ndisebenza ngaxesha athile		Adiwufumani umsebenzi	
01		03		04		05	

9. Andisebenzi ngenxa yesizathu (umzekelo, sendimdala iminyaka ayisandivumeli) ungasifaka isizathu:……..

10. Yenza ntoni intloko yekhaya xa isebenza? :…….....

11. Isimo sempilo kwintloko yekhaya

Ikwimo entle kakhulu		Inteke-nteke		Andazi		Andiqiniseki		Angeke ndikwazi ukusho	

INCUKACHA ZEKHAYA

12. Bangaphi abantu balapha ekhaya xa ubala nentloko yekhaya? ……

13. Bangaphi abantwana balapha ekhaya abafundayo? ……..…

14. Bangaphi abantu balapha ekhaya abankuleminyaka engezantsi?

Ibakala leminyaka	Inani labantu balapha ekhaya abakwibakala ngalinye
0-14	
15-39	
40-64	
65+	

15. Bangaphi abantu balapha ekhaya abaqeshwe ngokupheleleyo, kunye nabasebenza ngamaxesha athile?

Uhlobo lomsebenzi	Inani labantu balapha ekhaya abakwibakala ngalinye lomsebenzi
Ndiqeshwe ngokupheleleyo	
Ndisebenza ngamaxesha athile	

16. Ingabe ukhona umntu walapha ekhaya ofumana ikamkam kwezintlobo zilandelayo?

Uhlobo lwekamkam	Ewe	Hay	Inani labantu abafumana ikamkam kwibakala ngalinye
Ikamkam yobudala			
Ikamkam yokukhubazeka			
Ikamkam yomntwana			
Ikamkam yomntwana ongenabazali			
Olunye uhlobo lwekamkam			

17. Ingabe ikhona enye imali oyifumana kwindawo ezahluka-hlukeneyo ngenyanga?

Yes		No	
1		0	

18. Xa ikhona enye imali oyifumana kwindawo ezahluka-hlukeneyo, khawenze uqikelelo kuba ibayimalini ngenyanga? R.....

19. Xa uqikelela leliphi ibakala lemali eniyifumana apha ekhaya ngenyanga?

Ayikho imali engenayo ngenyanga	
R1 to R400	
R401 to R800	
R801 to R1 600	
R1 601 to R3 200	
R3 201 to R6 400	
R6 401 to R12 800	
R12 801 to R25 600	
R25 601 to R51 200	
Angeke ndikwazi ukusho/Andiqiniseki	

20. Ingabe ukhona umntu apha ekhaya onenye yezi zinto zingezantsi?

Uhlobo lwezinto zexabiso	Ewe	Hayi
Unomathotholo osebenzayo		
Ifrigi esebenzayo		
Ibhayisekile esebenzayo		
Umabonakude osebenzayo		
Imoto okanye ilori esebenzayo		
Ifowuni yasendlini esebenzayo		
Ifowuni yeselula esebenzayo		
Isitofu sombani esisebenzayo		
Umshini wokuthunga impahla osebenzayo		
Isitofu sokufudumeza (imayikroweyivu) esisebenzayo		
Ireyido yeDVD esebenzayo		
Ikhomputha esebenzayo		

Umshini wokuhlamba impahla osebenzayo		
Ikhamera esebenzayo kodwa hayi eyefowuni		

SERVICES AND INFRASTRUCTURE

21. Niwafumanaphi amanzi apha ekhaya?

Epayipini eliwazisa endlini	
Etephini esebaleni	
Etephini yasekuhlaleni	
Emngxunyeni ekutsalwa kuwo amanzi (Borehole)	
Emlanjeni	
Emthonjeni	
Olunye uhlobo lwendawo ofumana kulo amanzi: itanki	

22. Loluphi uhlobo lwethoyilethi ekhona apha ekhaya?

Uhlobo lwethoyilethi	Tick
Ithoyilethi eflashwayo	
Ithoyilethi yomgodi	
Akukho thoyilethi	
Olunye uhlobo	

23. Ukhona umbani apha ekahya?

Ewe	
Hayi	

24. Yintoni eniyisebenzisa kakhulu xanipheka kwezi zinto zingezantsi? (Khetha ibenye kuphela)

Umbani kaEskom	
Umbani wesola	
Umbani wejenereyitha	
Igesi	
Uparafini	
Inkuni	
Amalahle	
Amalongwe	
Olunye uhlobo olungekhoyo kwezintlobo zingasentla	

25. Yintoni eniyisebenzisa kakhulu ekulayiteni? (Khetha ibenye kuphela)

Umbani kaEskom	
Umbani wesola	
Umbani wejenereyitha	
Ighesi	
Ipabafini	
Amakhandlela	
Olunye uhlobo olungekhyo kwezi zingasentla	

26. Uhamba ixesha elingakanina xa usiya emgaqweni omkhulu? .....

AGRICULTURAL ACTIVITIES

27. Lukhona uhlobo lwemfuyo onalo?

Ewe	
Hayi	

28. Xa unayo imfuyo yintloboni? Inoluphi uncedo ekhaya?

29. Xa ungafuyi ingabe sikhona isizathu sokuba ungafuyi?

30. Ingabe zikhona izinto oyityalayo enyakeni?

Ewe	
Hayi	

31. Xazikhona izinto ozityalayo kuba zintoni?

32. Ingabe zikhona iziqhamo ozityalayo okanye imifuno (umzekelo, isipinash, imithwani)

Iziqhamo/imifuno	Ewe	Hayi
Iziqhamo		
Imifuno (umzekelo, amathanga, isipinashi nokunye)		

33. Xa utyala iziqhamo yintloboni yeziqhamo ozityalayo?

34. Xa utyala imifuno ngabe utyala ntloboni yemifuno?

35. Xa ungatyali kwanto (umzekelo, umboana) okanye imifuno okanye iziqhamo ingabe sikhona isizathu sokuba ungatyali?

36. Xa zikhona izinto ozityalayo (umzekelo, umbona) okanye iziqhamo okanye imifuno, ngabe ikhona inxenye yezinto ozithengisayo kwizinto ozityalayo?

Yes	
No	

37. Xa uthengisa kwizinto ozityalayo, uthengiso ntoni? Uthengisa kangakanani?

38. Ingabe uyazisebenzisa ezi zinto zingezantsi entsimini yakha?

	Rhoqo	Nganye amaxesha	Akwenzeki
Imbewu esemgangatheni ophezulu			
Izinto ezivundisa umhlaba (umzekelo, umanyola)			
Ushini wokuthelela xakunembalela			
Ingabe lukhona uqeqesho olufumana kubalimi			
Inxaso esuka kumaqela azimeleyo (NGOs) angekhoyo ngaohantsi kukarhulumente			
Inxaso esuka kurhulumente			
Uyakwazi kufumana isikweleti sokuba ulime			
Uyakwazi ukuqashisa ngentsimi yakho lumaqela alimayo okanye kumnye umntu			

39. Ingabe ukulima kunegalelo kwimali eniyifumana ngenyanga?

40. Ngabe uyakwazi ukuyothengisa izinto ozityalayo kwindawo esedolophini?

Ewe	
Hayi	

41. Kuba lixesha elingakanani kuba ufike apho uthengisela khona? ……

42. Ingabe ungomnye wabantu ababuyiselwe umhlaba ngurhulumente owathathwa ngexesha localu-calulo? (Nokuba yimali)

Ewe	
Hayi	

43. Xa ufumene lomhlaba okanye imali nagbe ikhonto into oyixhamlayo ngokufuna lomhlalba?

44. Xa ufumene lomhlaba, ngawaphi amahla ndonyuka ohlangabezana nawo?

45. Ngubani utyalayo entsimini okanye egadini

46. Xa kuyintloko yekhaya isebenza iyhure ezingaphi entsimini ngeveki? ..……...

47. Ineminyaka emingaphi ilima intloko yekhaya? ……

48. Ingabe unqwenela ukuba urhulumente akuxhase ngantoni ukuze ukwazi ukufumana isivuno esingcono entsimini okanye egadini yakho?

49. Ingabe ezi zinto zingezantsi ziyenzeka kuwe?

	Ewe	Hayi
Ingabe unawo umbutho ogcina kuwo imali?		
Ingabe ukuba lilungu kwakho kulombutho kuyakunceda kuba ubenemali?		
Ingabe imbalela inegalelo kwisivuno sakho?		
Ingabe izilwanyana (intake, nezinye ezitya izityalo) kunye nezifo ezifana nentlava ziyasichaphazela isivuno sakho?		
Ingabe ulilingu nokuba kukweliphi iqela lokulima?		
Ingabe ukuba lilungu kwakho kwiqela lokulima lunalo ushintsho ebomini bakho?		
Uyakwazi ukufumana umhlaba xa ufuna umhlaba omninzi wokulima kusibonda okanye kunkosi?		

50. Yeyiphi inyanga obanesivuno esininzi kwizinto ozityala entsimini okanye egadini?

	J	F	M	A	M	J	J	A	S	O	N	D
Kubakuninzi												
Kuba kunzinane												
Akubikho nokuncinane												

51. Yeyiphi inyanga obanemifuno emininzi ngayo entsimini okanye egadini?

	J	F	M	A	M	J	J	A	S	O	N	D
Ibamininzi												
Ibamincinane												
Akukho kwanto												

52. Yeyiphi inyanga ophelelwa ngayo kukutya?

J	F	M	A	M	J	J	A	S	O	N	D

UKUFIKELELA EKUTYENI

53. Nikufumanaphi ukutya enikutyayo? Khetha kwezintlobo zingezantsi

Uhlobo lwendawo	Ewe	Hayi
Kwivenkile (izitolo) ezisedolophini		
Kwivenkile (izitolo) ezisekuhlaleni		
Ndifumana uncedo lokutya kwamahala kurhulumente		
Ndifumana uncedo lokutya kwamahala kwimibutho ezimeleyo engekhoyo phantsi kukarhulumente		
Ndiyazilimela		
Ndikufumana kubantu abathengisa emgaqweni khona apha ekuhlaleni		
UKHUSELEKO NGOKUTYA		

54. Ubukho bokutya ekhayeni kwiveki ezine ezadluleyo

	Akukaze kwenzeke	Kambalwa (Kanye okanye kabini enyangeni)	Ngamaxa athile (kathathu ukuya eshumini ngenyanga).	Ngamaxesha onke (ngaphezu kweshumi enyangeni)

Kwiveki ezine ezadlulileyo kukekwenzeka kuba ubenexhala lokuba apha ekhaya ningangabi nako ukutya okwaneleyo? Xa kuke kwenzeka kwenzeka kangaphi ngenyanga?	0	1	2	3
Kuveki ezine ezadlulileyo nokuba ngubani apha ekhaya uke wakutya ukutya ongakuthandiyo ngoba ungenandlela yokuba ukufumane ukutya akuthandayo (umzekelo ukungabikho kwemali). Xa kuke kwenzeka kwenzeka kangaphi ngenyanga?	0	1	2	3
Kwiveki ezine ezadluleyo ingabe nokuba ngubani apha ekhaya uke wakutya ukutya okuncinane kwintlobo ezahlukeneyo zokutya ngoba kungekho mali yokuthenga ukutya okuninzi kwentlobo ezahlukeneyo? Xa kuke kwenzeka kwenzeka kangaphi ngenyanga?	0	1	2	3
Kwiveki ezine ezadluleyo ingabe nokuba ngubani na apha ekhaya uke wakutya ukutya angakufuniyo ngokuba kungekho indlela yokuba kufumaneke ezinye intlobo zokutya? Xa kuke kwenzeka kwenzeka kangaphi ngenyanga?	0	1	2	3
Kwiveki ezine ezadluleyo ingabe nokuba ngubani apha ekhaya uke wakutya ukutya okuncinane ngokuba kungekho ukutya okwaneleyo? Xa kuke kwenzeka kwenzeka kangaphi ngenyanga?	0	1	2	3
Kwiveki ezine ezadluleyo ingabe nokuba nokuba ngubani apha ekhaya uke watya ukutya okumbalwa osukwini ngokuba kungekho kutya kwaneleyo? Xa kuke kwenzeka kwenzeka kangaphi ngenyanga?	0	1	2	3
Kwiveki ezine ezadluleyo kuke kwenzeka kuba kungabikho nokuba loluphi uhlobo lokutya ngokuba kungekho indlela yokufumana ukutya (umzekele kungabikho mali yokuthenga ukutya). Xa kuke kwenzeka kwenzeka kangaphi ngenyanga?	0	1	2	3
Kwiveki ezine ezadluleyo ingabe nokuba ngubani walapha ekhaya uke walala engatyanga ngokuba kungekho kutya kwaneleyo? Xa kuke kwenzeka kwenzeka kangaphi ngenyanga?	0	1	2	3
Kwiveki ezine ezadluleyo ingabe nokuba ngubani apha ekhaya uke wahamba usuku lonke nobusuku engatyanga kwanto ngokuba kungekho kutya kwaneleyo? Xa kuke kwenzeka kwenzeka kangaphi ngenyanga?	0	1	2	3

55. Ndicela uchaze ukutya okutyiwe apha ekhaya kunye neeziselo ebeziselwa emini nasebusuku

Isidlo sasekuseni (ukutya kunye neziselo)
Isidlo sasekuseni (ukutya kunye neziselo)
Isidlo sangokuhlwa (ukutya kunye neziselo)

56. Uluhlu lwentlobo zokutya okohlukeneyo (ukutya obekutyiwa izolo emini nasebusuku)

Question Number	**umzekelo**	**Ewe=1 Hayi=0**
1	Umbona, irayisi, inqolowa, utywala benkoduso/ amazimba okanye uke wasitya sonka, amanuglizi okanye ipapa izolo?	
2	Amazambani (iitapile) amhlophe, ubhatata omhlophe, amadumbe amhlophe	
3	Ithanga, ukherothi, ithanga lemithwani, ubhatata o-Orenji ngaphakathi, upelepele obomvu omkhulu	
4	Imifuno eluhlaza enamagqabi afuna ukubamnyama, umzekelo isipinashi okanye imithwane?	
5	Itumato, u-Anyanisi, imifuno efumaneka ekuhlaleni (umzekelo umambumbu)?	
6	Umango, imeloni, amaphishi/amaphishi onyisiweyo, ijusi eyenziwe ngeziqhamo kuphela (100% fruit juice)	
7	Iziqhamo zasendle, ijusi eyenziwe ngeziqhamo kuphelaother (100% fruit juice)	

8	Isibindi, izintso, inqakalaliver	
9	Inyama yenkomo, inyama yehagu, inyama yebhokhwe, igusha, inyama yomvundla, inyama yenkukhu, yekewu, inyama yentaka nokuba loluphi uhlobo	
10	Amaqanda enkukhu, ekewu, nokuba yeyiphi intlobo yeqanda	
11	Intlanzi eqwayitiwewo, ufishi osethineni	
12	Imbotyi, iphizi, amakinati, ibhotolo (peanut butter)	
13	Ubisi, ushizi, iyogathi, okanye ukutya okwenziwe ngobisi	
14	Amafutha okupheka , nokuba yeyiphi intlobo yamafutha (umzekelo, iholisam)	
15	Iswekile, incindi yenyosi, idirinki nokuba loluphi ohlobo, ijusi, ishokholethi, iiswiti, amakhekhe?	
16	Isipayisi, ityuwa, itumato sosi eyenziwe ngesoya, isosi enopelepele, ikofu, iti, iziselo ezinxilisayo	

APPENDIX C: CROSS TABULATIONS

Table 5.2 C: Food security and gender cross tabulation

fsec * hhhg Crosstabulation

Count

		hhhg			
		female	male	Total	
fsec	food insecure	107	98	205	0.621212
	food secure	43	82	125	0.378788
Total		150	180	330	

exp	
93.18182	111.8182
56.81818	68.18182
	0.001637
	9.917815
	3.841459

Thable 5.3 C: food security and marital status cross tabulation

fsec * hhhm Crosstabulation

Count

		hhhm			
		singel head	maried	Total	
fsec	food insecure	117	88	205	0.621212
	food secure	22	103	125	0.378788
Total		139	191	330	

exp	
86.34848	118.6515152
52.65152	72.34848485
	1.85768E-12
	49.62884332
	3.841458821

Table 5.4 C: Food security and education cross tabulation

fsec * HHHed2 Crosstabulation					
Count					
		HHHed2		Total	
		never went t	secondary and matric +		
fsec	food inse	127	78	205	0.621212
	food secu	31	94	125	0.378788
Total		158	172	330	
	exp	98.15151515	106.8485		
		59.84848485	65.15152		
		5.62272E-11			
		42.94755097			
		3.841458821			

Table 5.5 C: Food security and remittances cross tabulation

fsec * rem Crosstabulation					
Count					
		Rem			
		no remittances	remittances	Total	
fsec	food insecure	183	22	205	0.621212
	food secure	56	69	125	0.378788
Total		239	91	330	
exp					
148.4697	56.53030303				
90.5303	34.46969697				

Table 5.7 C: Food security and household size cross tabulation

fsec * hhs_category Crosstabulation

Count

		hhs_category			
		equal to 4 or less	equal to 5 or more	Total	
fsec	0	72	133	205	0.621212
	1	97	28	125	0.378788
Total		169	161	330	

exp	
104.9848	100.0151515
64.01515	60.98484848
	6.96438E-14
	56.07602937
	3.841458821

Table 5.8 C: Food security and employment status cross tabulation

fsec * hhhemp Crosstabulation

Count

		hhhemp			
		0	1	Total	
fsec	0	192	13	205	0.621212
	1	72	53	125	0.378788
Total		264	66	330	

exp					
164	41		164	41	
100	25		100	25	
Pr	1.96231E-15		1.96231E-15		
			63.06654055		
			3.841458821		

Table 5.9 C: Food security and age cross tabulation

fsec * age_category Crosstabulation

Count

		age_category						
		less or equal to 35	36 to 40	41 to 45	46 to 50	51 or more	Total	
fsec	0	16	20	19	33	117	205	0.621212
	1	1	17	13	42	52	125	0.378788
Total		17	37	32	75	169	330	

		exp						
		10.56060606	22.98485	19.87879	46.59091	104.9848		
		10.56060606	22.98485	12.12121	28.40909	64.01515		
		1.50162E-05						
		27.60216599						
		9.487729037						

Table 5.10 C: Food security and household income cross tabulation

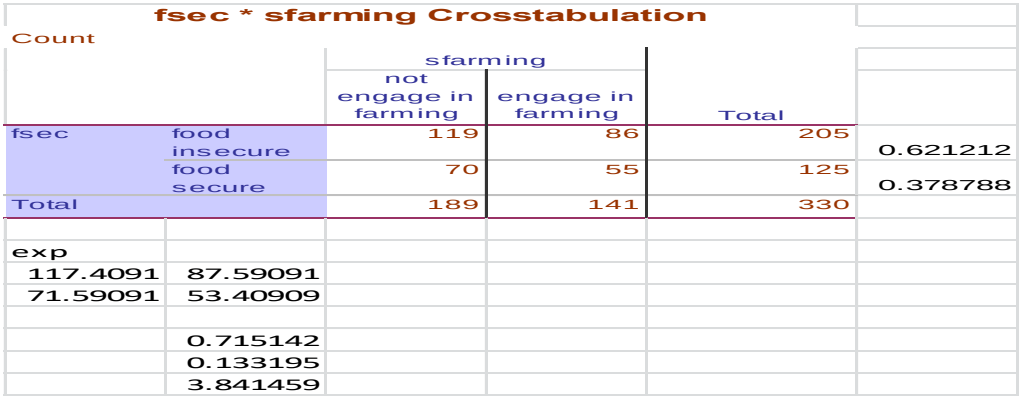
fsec * hhinc_categ Crosstabulation

Count

		hhinc_categ					
		1 to 800	801 to 1600	1601 to 3200	3201 or more	Total	
fsec	0	37	120	40	8	205	0.621212
	1	1	31	63	30	125	0.378788
Total		38	151	103	38	330	

exp							
23.60606	93.80303	63.98485	23.60606061				
14.39394	57.19697	39.01515	14.39393939				
			1.84155E-19				
			90.35092153				
			7.814727903				

Table 5.11 C: Food security and own food production cross tabulation



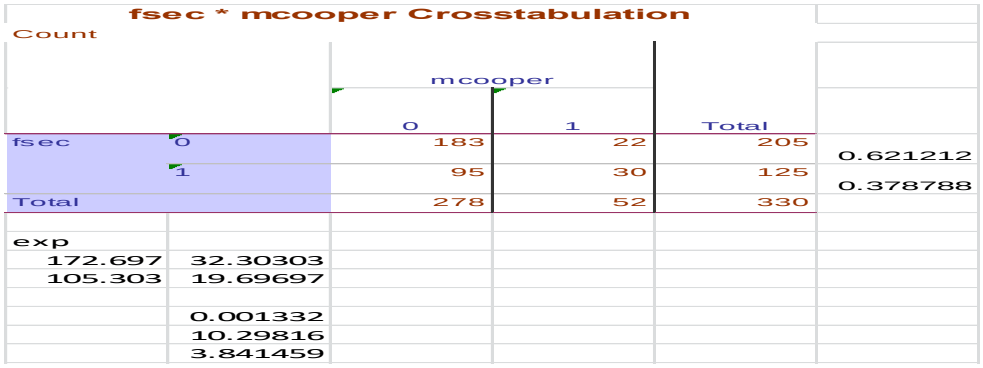
fsec * sfarming Crosstabulation

Count

		sfarming			
		not engage in farming	engage in farming	Total	
fsec	food insecure	119	86	205	0.621212
	food secure	70	55	125	0.378788
Total		189	141	330	

exp	
117.4091	87.59091
71.59091	53.40909
	0.715142
	0.133195
	3.841459

Table 5.12 C: Food security and cooperative membership cross tabulation



fsec * mcooper Crosstabulation

Count

		mcooper			
		0	1	Total	
fsec	0	183	22	205	0.621212
	1	95	30	125	0.378788
Total		278	52	330	

exp	
172.697	32.30303
105.303	19.69697
	0.001332
	10.29816
	3.841459

Table 5.13 C: Food security and land restitution cross tabulation

fsec * LR Crosstabulation

Count

		LR			
		0	1	Total	
fsec	0	193	12	205	0.621212
	1	123	2	125	0.378788
Total		316	14	330	
		exp			
		196.303	8.69697		
		119.697	5.30303		
		Pr	0.062927		
		Chisq	3.458501		
		Chi crit	3.841459		

Table 5.14 C: Food security and farm income cross tabulation

fsec * farminc Crosstabulation

Count

		farminc			
		do not sell any produce	sell some of the produce	Total	
fsec	food insecure	202	3	205	0.621212
	food secure	124	1	125	0.378788
Total		326	4	330	
	exp				
	202.5152	2.484848			
	123.4848	1.515152			
		0.593177			
		0.285411			
		3.841459			

Table 5.15 C: Food security and livestock ownership cross tabulation

fsec * livest-ownership Crosstabulation

Count

		livest-ownership			
		0	1	Total	
fsec	0	133	72	205	0.621212
	1	62	63	125	0.378788
Total		195	135	330	

	exp		
	121.1364	83.86364	
	73.86364	51.13636	
	0.006177		
	7.497996		
	3.841459		

Table 5.16 C: Food security and improved seeds cross tabulation

fsec * impr_seed Crosstabulation

Count

		impr_seed			
		no improved seed	improved seed	Total	
fsec	food insecure	138	67	205	0.621212
	food secure	75	50	125	0.378788
Total		213	117	330	

exp					
132.3182	72.68182				
80.68182	44.31818				
	0.177705				
	1.816716				
	3.841459				