

**ANALYSING FOOD SECURITY AMONG RURAL HOUSEHOLDS OF CAPRICORN  
AND MOPANI DISTRICTS, LIMPOPO PROVINCE, SOUTH AFRICA**

by

**RUDZANI NENGOVHELA**

Thesis submitted in partial fulfilment of the requirements for the degree of

**Doctor of Philosophy in Agriculture (Agricultural Economics)**

in the

Department of Agricultural Economics and Animal Production

in the

**FACULTY OF SCIENCE AND AGRICULTURE**

**(School of Agricultural and Environmental Sciences)**

at the

**UNIVERSITY OF LIMPOPO**

**Supervisor: Prof A Belete (University of Limpopo)**

**Co-Supervisor: Prof JJ Hlongwane (University of Limpopo)**

**Co-Supervisor: Prof IB Oluwatayo (University of Venda)**

**2022**

## **DECLARATION**

I declare that the thesis hereby submitted to the University of Limpopo, for the degree of Doctor of Philosophy in Agriculture (Agricultural Economics) has not previously been submitted by me for a degree at this or any other university; that is my work in design and in execution, and that all material contained herein has been duly acknowledged.

---

**Surname, initials (title)**

---

**Date**

## **DEDICATION**

*To my family, thank you for all the love, support, and encouragement you have shown to me.*

*I love you all.*

## **ACKNOWLEDGEMENTS**

I thank the God of Mount Zion for always being there for me. He has been with me throughout everything. I acknowledge Prof. Abenet Belete for being the best supervisor, for believing in me, inspiring me and for all your comments and encouragement. I extend my profound gratitude to my Co-supervisors, Prof. Johannes Jan Hlongwane and Prof. Isaac Busayo Oluwatayo, respectively, for their advice, endless support and always providing invaluable information to fortify my thesis. I thank all the lecturers in my Faculty, School and Department for sharing their opinions and knowledge during presentations.

My sincere thanks also go to my parents, and my siblings for their love, support, words of encouragement and for always having faith in me. If it were not for you guys, I would have given up. I appreciate all my friends for their support, and for always being there for me when I needed you. I would also like to express my sincere gratitude to all the respondents in my study for their time, attention, and co-operation.

Last but not least, I acknowledge the NRF-DAAD for granting me the scholarship. The execution and ultimate completion of this study would have not been possible without your financial support.

## ABSTRACT

Regardless of the various measures implemented by the South African government to curb food insecurity, majority of rural households are still experiencing food insecurity at the household level. This could be because of the high unemployment rate that the rural households are experiencing, especially in the Limpopo Province. Despite rural household members exerting frantic efforts to acquire education, most of them still find it difficult to secure jobs, which results in them depending on social grants for a living. Still, social grant money alone is not enough to meet their entire families' needs, including food acquisition. The aim of the study was to analyse food security looking at four dimensions, namely, food availability, access, utilisation, and stability among rural households of Capricorn and Mopani Districts in the Limpopo Province of South Africa.

Only two district municipalities in the Limpopo Province, namely, Mopani and Capricorn Districts, were chosen as areas of study. The two district municipalities were chosen because, previous studies and reviews reported that these municipalities are the most affected districts by food insecurity shocks in the Limpopo Province. The study used a cross-sectional survey, where a Multistage sampling procedure was employed. The villages were selected based on probability proportionate to size. The study considered a total of 346 rural households, comprising 173 rural households in each district municipality. A structured questionnaire was used as an instrument to collect data from rural households in the study area. In addition, the collected data was captured using Excel 16. Thereafter, the data was exported to SPSS Version 27 for analysis. Furthermore, to profile the socio-economic characteristics of households, assess food consumption patterns and identify the strategies employed to enhance household food security, descriptive statistics was used. To determine the food security status of rural households in the study areas, the four dimensions of food security were analysed separately. For instance, food availability was analysed using descriptive statistics whereas food accessibility was analysed using Household Food Insecurity Access Scale [HFIAS]. The HFIAS was also used to identify the food security status while Household Dietary Diversity Score [HDDS] was used to measure food utilisation. To measure food stability, a Likert Scale [LS] and descriptive statistics were used. Multiple Linear Regression Models [MRM] were used to determine the

factors that influenced rural households' food security status. On the other hand, the Multinomial Logistic Regression Model [MLRM] was used to examine the determinants of food security among rural households of Capricorn and Mopani district municipalities.

The descriptive results established that most rural households from both Mopani District Municipality [MDM] and Capricorn District Municipality [CDM] consume different food groups. In this regard, a minority of rural households are classified as dietary diverse whereas a majority of rural households are still characterised as less dietary diverse due to the limited consumption of different food groups. This reveals that these households range from less food secure to moderate food secure, as illustrated by the food security results. Moreover, the descriptive results also indicated that a majority of rural households in MDM are classified as severely food insecure and that food stability was the component contributing to these households being severely food insecure. As for CDM rural households, the results showed that a majority of these rural households were moderately food insecure with food availability and food stability being the contributing component at CDM. The Multiple linear Regression Model [MRM] results in MDM revealed that the age of the household head, remittances, and access to credit positively influenced food security status. On the other hand, the Multinomial Logistic Regression Model [MLRM] results in MDM revealed that the age of household head, household income greater than R1000, household income between R1099 to R1999, household income between R4000 to R4999, income from salary and access to credit, negatively influence food insecurity status. The Multiple Linear Regression Model confirmed that the male headed households, age of household head, wages, employment status and household income negatively influence food security status in CDM. On the contrary, MLRM results revealed that gender of household head, income from wages, income from salary, old age pension grant, child support grant, household income above R1000 and access to credit for borrowing money positively influenced the food security status of rural households in CDM.

In light of this, the study recommends that health practitioners should educate rural households about healthy eating habits and that having a variety of nutritious food type may increase food security. The Department of Agriculture should advise rural

households to participate primarily in subsistence farming and that they should focus their agriculture on crops and livestock. This will enable them to enjoy diverse and balanced diets. In addition, the government should empower rural households to participate in development programmes. This may assist households to improve their livelihoods and may also lead to diverse sources of income, which may enhance food security. Furthermore, the government can further assist rural households by providing production inputs (such as seeds/seedlings, fertilizers, and water for irrigation), which may promote food availability, utilisation and accessibility.

**Keywords:** Rural households, Household Dietary Diversity Score, Household Food Insecurity Access Scale

## TABLE OF CONTENTS

DECLARATION	i
DEDICATION	ii
ACKNOWLEDGEMENTS	iii
ABSTRACT	iv
LIST OF TABLES	xiii
LIST OF FIGURES	xiv
ABBREVIATION	xv
CHAPTER ONE: INTRODUCTION	1
1.1 BACKGROUND INFORMATION	1
1.2 PROBLEM STATEMENT	2
1.3 RATIONALE OF THE STUDY	4
1.4 AIM AND OBJECTIVES OF THE STUDY	6
1.4.1 Aim of the study	6
1.4.2 Objectives of the study	6
1.4.3 Research hypothesis of the study	6
1.5 OUTLINE OF THE STUDY	7
CHAPTER TWO: LITERATURE REVIEW	8
2.0 INTRODUCTION	8
2.1 THE CONCEPT AND EVOLUTION OF FOOD SECURITY	8
2.2 PILLAR OF FOOD SECURITY	9
2.3 LEVELS OF FOOD SECURITY	9
2.3.1 Global food security	10
2.3.2 Food security at National level	12
2.3.3 Food security at Provincial level	13
2.3.3.1 Food security status in Limpopo Province	13
2.3.4 Food security at Household level	13
2.3.4.1 Dietary Diversity and food frequency	15
2.3.4.2 Spending on food	15
2.3.4.3 Consumption Behaviours	15
2.3.4.4 Experiential indicators	15
2.3.4.5 Self-assessment measurement	16



2.4 CHALLENGES OF FOOD SECURITY AT HOUSEHOLD LEVEL IN SOUTH AFRICA	16
2.5 POSITIVE OUTCOMES ON FOOD SECURITY AT HOUSEHOLD LEVEL	18
2.6 FACTORS THAT INFLUENCE FOOD SECURITY	20
2.6.1 Socio-economic factors	21
2.6.2 Institutional factors	23
2.6.3 Environmental factors	24
2.7 RURAL HOUSEHOLDS COPING STRATEGIES FOR FOOD SHORTAGES	25
2.8 CHAPTER SUMMARY	26
CHAPTER THREE: OVERVIEW OF FOOD SECURITY IN SOUTH AFRICA	27
3.0 INTRODUCTION	27
3.1 HISTORY OF FOOD SECURITY IN SOUTH AFRICA	27
3.2 FOOD SECURITY STATUS IN SOUTH AFRICA	28
3.3 FOOD SECURITY IN THE URBAN/RURAL AREAS OF SOUTH AFRICA	29
3.4 AGRICULTURAL PRODUCTION PATTERNS IN SOUTH AFRICA	31
3.5 FOOD CONSUMPTION PATTERNS IN SOUTH AFRICA	32
3.6 POVERTY IN SOUTH AFRICA	33
3.7 MEASURES TO ENHANCE FOOD SECURITY IN SOUTH AFRICA	35
3.8 CHAPTER SUMMARY	36
CHAPTER FOUR: DESCRIPTION OF THE STUDY AREAS, RESEARCH METHODOLOGY AND ANALYTICAL PROCEDURE	37
4.0 INTRODUCTION	37
4.1 DESCRIPTION OF THE STUDY AREA	37
4.2 DESCRIPTIONS AND MAIN CHARACTERISTICS OF THE LOCAL MUNICIPALITIES UNDER MOPANI	39
4.2.1 Greater Tzaneen	39
4.2.2 Greater Letaba	40
4.2.3 Greater Giyani	40
4.2.4 Ba-Phalaborwa	41
4.2.5 Maruleng	41

4.3 DESCRIPTIONS AND MAIN CHARACTERISTICS OF THE LOCAL MUNICIPALITIES UNDER CAPRICORN	42
4.3.1 Blouberg	42
4.3.2 Molemole	42
4.3.3 Polokwane	43
4.3.4 Lepelle-Nkumpi	43
4.4 RESEARCH DESIGN	44
4.4.1 Methods and research instruments	44
4.5 SAMPLING FRAME	44
4.6 SAMPLING PROCEDURE	45
4.7 SAMPLE SIZE	46
4.8 ENUMERATOR SELECTION AND TRAINING	47
4.9 JUSTIFICATION FOR THE SELECTION OF THE STUDY AREA	47
4.10 FOOD SECURITY CONCEPTUAL FRAMEWORK	47
4.11 PILLARS OF FOOD SECURITY	49
4.11.1 Availability	49
4.11.2 Accessibility	49
4.11.3 Utilisation	49
4.11.4 Stability	50
4.12 DESCRIPTIVE ANALYSIS	50
4.13 FOOD SECURITY INDEXES	50
4.13.1 Household Food Insecurity Access Scale (HFIAS)	51
4.13.2 Household Dietary Diversity Score (HDDS)	54
4.14 MULTIPLE LINEAR REGRESSION MODEL (MRM)	56
4.15 MULTINOMIAL LOGISTICS REGRESSION MODEL (MLRM)	57
4.16 DESCRIPTION OF VARIABLES SPECIFIED IN THE MULTIPLE LINEAR REGRESSION AND MULTINOMIAL LOGISTIC REGRESSION MODELS	58
4.16.1 Socio-economic factors	59
4.16.1.1 Age	60
4.16.1.2 Gender	60
4.16.1.3 Household income	60
4.16.1.4 Household size	61

4.16.1.5 Level of education	61
4.16.1.6 Employment status	61
4.16.1.7 Remittances	62
4.16.2 Institutional factors	62
4.16.2.1 Access to credit for borrowing money	62
CHAPTER FIVE: MOPANI DISTRICT MUNICIPALITY: DESCRIPTIVE STATISTICS, EMPIRICAL FINDINGS AND DISCUSSION	63
5.0 INTRODUCTION	63
5.1 ANALYSIS OF THE FOUR DIMENSIONS OF FOOD SECURITY	66
5.1.1 Availability of food	68
5.2 DETERMINANTS OF HOUSEHOLD FOOD SECURITY STATUS AMONG RURAL HOUSEHOLDS OF MDM	68
5.2.1 Age of a household head	69
5.2.2 Remittances	70
5.2.3 Access to credit	70
5.3 Utilisation of food	71
5.4 Stability of food	71
5.5 ANALYSIS OF FOOD SECURITY STATUS AMONG HOUSEHOLDS OF MOPANI	73
5.6 Less food insecure vs Moderately food insecure households	76
5.6.1 Age of a household head	76
5.6.2 Household income greater than R1000	77
5.6.3 Household income between R1099 to R1999	77
5.6.4 Household income between R4000 to R4999	77
5.6.5 Child support grant	77
5.6.6 Access to credit	78
5.7 Less food insecure vs Severe food insecure households	78
5.7.1 Household income between R1099 to R1999	78
5.7.2 Income from salary	79
5.7.3 Access to credit for borrowing money	79
5.8 COPING STRATEGIES FOR FOOD SHORTAGES	79

5.9 SUMMARY OF HOUSEHOLD DIETARY DIVERSITY SCORE, HOUSEHOLD FOOD INSECURITY ACCESS SCALE, MULTIPLE LINEAR AND MULTINOMIAL LOGISTIC REGRESSION MODEL RESULTS	80
CHAPTER SIX: CAPRICORN DISTRICT MUNICIPALITY DESCRIPTIVE STATISTICS, EMPIRICAL FINDINGS AND DISCUSSION	82
6.0 INTRODUCTION	82
6.1 ANALYSIS OF THE FOUR DIMENSIONS OF FOOD SECURITY	85
6.1.1 Availability of food	85
6.1.2 Accessibility of food	85
6.2 DETERMINANTS OF HOUSEHOLD FOOD SECURITY STATUS AMONG RURAL HOUSEHOLDS OF CDM	87
6.2.1 Gender	87
6.2.2 Age of a household head	88
6.2.3 Employment status	88
6.2.4 Household income	87
6.2.5 Source of income	89
6.2.6 Access to credit	89
6.3 Utilisation of food	90
6.4 Stability of food	90
6.5 ANALYSIS OF FOOD SECURITY STATUS AMONG HOUSEHOLDS OF CAPRICORN	92
6.5.1 Less food insecure vs Moderately food insecure households	96
6.5.1.1 Income from wages	96
6.5.1.2 Income from salary	96
6.5.1.3 Old age pension grant	96
6.5.1.4 Child support grant	97
6.5.2 Less food insecure vs Severe food insecure households	97
6.5.2.1 Gender of a household head	97
6.5.2.2 Household income above R1000	98
6.5.2.3 Income from wages	98
6.5.2.4 Income from salary	98
6.5.2.5 Income from old pension grant	98
6.5.2.6 Child support grant	99

6.5.2.7 Access to credit for borrowing money	99
6.6 COPING STRATEGIES FOR FOOD SHORTAGES	99
6.7 SUMMARY OF HDDS, HFIAS, MULTIPLE LINEAR AND MULTINOMIAL LOGISTICS REGRESSION MODELS RESULTS	100
CHAPTER SEVEN: RESEARCH SUMMARY, CONCLUSIONS AND POLICY RECOMMENDATIONS	102
7.0 INTRODUCTION	102
7.1 RESEARCH SUMMARY	102
7.2 CONCLUSIONS	103
7.3 POLICY RECOMMENDATIONS	104
<b>LIST OF REFERENCES</b>	106
<b>APPENDIX A: Consent form</b>	123
<b>APPENDIX B: Household Questionnaire</b>	125
<b>APPENDIX C: Ethical Clearance certificate</b>	137
<b>APPENDIX D: Editorial Letter</b>	139

## LIST OF TABLES

Table 2.1: State of World Food Security	10
Table 4.1: Number of rural households per local municipality within Mopani and Capricorn Districts	45
Table 4.2: The distribution of the sample size with respect to each local municipality	46
Table 4.3: Household Food Insecurity Access Scale Generic questions	52
Table 4.4: The categories of food groups	55
Table 4.5: Variables specified in Multiple Linear Regression Model and their expected signs	58
Table 4.6: Variables specified in Multiple Logistic Regression Model and their expected signs	59
Table 5.1: Basic statistics of all the respondents	63
Table 5.2: Food consumption patterns	65
Table 5.3: Determinants of household food security	69
Table 5.4: Rural households food stability questions	71
Table 5.5: Factors determining food security among households of Mopani District	75
Table 6.1: Basic statistics of all the respondents	82
Table 6.2: Food consumption patterns	84
Table 6.3: Determinants of household food security	87
Table 6.4: Rural households food stability questions	90
Table 6.5: Factors determining food security among households of Capricorn District	93

## LIST OF FIGURES

Figure 4.1: Map of Limpopo Province	38
Figure 4.2: Map showing local municipalities at Mopani District	42
Figure 4.3: A map showing local municipalities with ward areas from Capricorn District	43
Figure 4.4: Conceptual framework of food security	48
Figure 5.1: Food availability in Mopani District	67
Figure 5.2: Household food security status of the study area	68
Figure 5.3: Rural household food utilization percentages	71
Figure 5.4: Household food security status of MDM	73
Figure 5.5: Coping strategies for food shortages in MDM	80
Figure 6.1: Food availability in Capricorn District	85
Figure 6.2: Household food security status of the study area	86
Figure 6.3: Rural household food utilization percentages	90
Figure 6.4: Household food security status of CDM	92
Figure 6.5: Coping strategies for food shortages in CDM	100

## LIST OF ABBREVIATIONS

<b>CDM</b>	Capricorn District Municipality
<b>CDP</b>	Community Development Programme
<b>COGTA</b>	Cooperative Governance and Traditional Affairs
<b>COVID</b>	Corona Virus Disease
<b>DAFF</b>	Department of Agriculture, Forestry and Fisheries
<b>DAEA</b>	Department of Agriculture and Environment Affairs
<b>DPW</b>	Department of Public Works
<b>EIU</b>	Economist Intelligence Unit
<b>FAO</b>	Food and Agriculture Organization of the United Nations
<b>FCS</b>	Food Consumption Score
<b>FANTA</b>	Food and Nutrition Technical Assistance
<b>FIES</b>	Food Insecurity Experience Scale
<b>FFSA</b>	Food Forward South Africa
<b>GHI</b>	Global Hunger Index
<b>GHS</b>	General Household Survey
<b>GVA</b>	Gross Value Added
<b>HDDS</b>	Household Dietary Diversity Score
<b>HFIAS</b>	Household Food Insecurity Access Scale
<b>HFSSMM</b>	Household Food Security Survey Measure Model
<b>HFCS</b>	Household Food Consumption Score
<b>HHs</b>	Households
<b>HHS</b>	Household Hunger Score
<b>IDP</b>	Integrated Development Plan
<b>IES</b>	Income and Expenditure Survey
<b>IFSS</b>	Integrated Food Security Strategy
<b>IFAD</b>	International Fund for Agricultural Development
<b>IFPRI</b>	International Food Policy Research Institute
<b>LFS</b>	Labour Force Survey



<b>LS</b>	Likert Scale
<b>MDM</b>	Mopani District Municipality
<b>MLRM</b>	Multinomial Logistic Regression Model
<b>MRM</b>	Multiple Linear Regression Model
<b>NDA</b>	National Development Agency
<b>NDP</b>	National Development Plan
<b>NFSNP</b>	National Food Security and Nutrition Plan
<b>NFCS</b>	National Food Consumption Survey
<b>NSNP</b>	National School Nutrition Programme
<b>RDP</b>	Reconstruction and Development Plan
<b>RCSI</b>	Reduced Coping Strategies Index
<b>RVAA</b>	Regional Vulnerability Assessment and Analysis Programme
<b>SDGs</b>	Sustainable Development Goals
<b>SA</b>	South Africa
<b>STATS SA</b>	Statistic South Africa
<b>SADC</b>	Southern African Development Community
<b>SANHNES</b>	South African National Health and Nutrition Examination Survey
<b>SASAS</b>	South African Social Attitudes Survey
<b>SPFS</b>	Special Programme Food Security
<b>UN</b>	United Nations
<b>USAID</b>	US Agency for International Development
<b>WHO</b>	World Health Organization
<b>WFP</b>	World Food Programme

## CHAPTER ONE

### INTRODUCTION

#### 1.1 BACKGROUND

Food and Agriculture Organization (2009) reported that food security exists “when all people, at all times, have physical, social, and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life”. Food security consists of four pillars, which are also considered as major factors affecting food security. These factors include: the availability of food, the accessibility of food, the utilisation of food and the stability of food supplies (Department of Agriculture, Forestry and Fisheries [DAFF], 2013).

According to De Cock *et al.* (2013) and D’ Hasese *et al.* (2013), South Africa experiences food insecurity at household level, particularly in rural areas. Matebeni (2018) noted that food security is still a big concern among many people in the country and that this situation is associated with high poverty levels that exist in South Africa. The findings from previous studies on household food security show that experience-based food insecurity levels are still high, regardless of the assistance from government which aims at curbing food insecurity (Matebeni, 2018). For instance, the Food and Agriculture Organization [FAO] (2010) noted that there were 264 million hungry people in sub-Saharan Africa, depicting that hunger remains a serious challenge. South Africa recorded about 35.7% of the population that lived below the poverty line \$2 a day, which is equivalent to R30.28 a day (World Bank, 2011).

Ncube and Kang’ethe (2015) state that, white people are a minority group in South Africa but still dominate as commercial farmers and have full control in the production system, which favour whites as producers. This leaves South Africans vulnerable to food insecurity because the black majority are subjected to white people’s food production calendar and lack purchasing power as well as the ability to compete in the open market. Against this backdrop, the democratic government has provided programmes such as the National School Nutrition Programme [NSNP], pension funds for the elderly, child support grants and employment opportunities through water and

community public works programmes, to improve food security conditions, particularly among the disadvantaged (Sekhampu, 2013).

The issues of household food and nutrition security have received increasing worldwide attention recently and this is due to the impact that climate change and tough economic conditions have on food systems (Statistics South Africa, 2019). A report by FAO (2018) cautioned that the world is not on track towards eradicating hunger by 2030, as envisioned in the Sustainable Development Goals [SDGs]. The report further indicates that approximately 821 million people in the world were undernourished in 2017 (World Health organization [WHO], 2018). Furthermore, in 2017, the Global Hunger Index [GHI] revealed that 52 out of 119 countries had GHI scores, which were rated as having either serious, alarming, or extremely alarming hunger (International Food Policy Research Institute [IFPRI], 2017). Eventually, a greater number of countries, including South Africa, are now recognising the need to expand the measurement of food and nutrition security and the importance of informing, planning and monitoring the progress towards achieving the 2030 targets (STATS SA, 2019).

Ndobo (2013) highlights the distinction between food security at the national and household level. This distinction is found to be crucial since the approach to assess food security at national and household levels are not the same (Du Toit *et al.*, 2011). Food security at the national level refers to the condition where the nation can manufacture, import, retain and sustain food needed to support its population with the minimum per capita nutritional standards (Joubert, 2021). At household level, food security refers to all members having access to sufficient food needed to sustain them and also enabling them to live a healthy life (Tonukar and Omotor, 2010). This simply means that a household is regarded as being food secure when its members do not live in hunger or fear of starvation (Du Toit *et al.*, 2011).

## 1.2 PROBLEM STATEMENT

South Africa is a country in transition from a century of colonial-based policies such as apartheid to a democratic, non-racial, and equal country (Hendricks, 2013). Since 1994, the South African government has been on a mission of rectifying disparities created by the apartheid regime across the disadvantaged population groups, which

include the black majority in the country (Hendricks, 2013). A vast majority of the disadvantaged population group is found in the former homelands (now rural parts of South African provinces) and such populations are still characterised by poverty and food insecurity (Statistics South Africa, 2017). The Limpopo Province is among the poorest provinces in South Africa; hence food insecurity is also high in this province (Statistics South Africa, 2016). Several studies have been conducted to assess food security in urban, peri urban and rural areas (Altman *et al.*, 2009; De Cock *et al.*, 2013; Hendricks, 2014; Nyathela and Oldewage-Theron, 2017; Boatemaa *et al.*, 2018). These studies confirmed that at a national level, the country is food secure, but the same cannot be said at a household level, particularly in rural parts of the Limpopo Province (Boatemaa *et al.*, 2018). Drysdale *et al.* (2019) suggested that at a household level, households should be capacitated to grow their own food either through seed programmes or by providing households with skills or equipment to produce their own food. Furthermore, Drysdale *et al.* (2019) indicate that this could reduce households' reliance on markets and thus become vulnerable to food price fluctuation.

Ngema *et al.* (2018) argued that food security at household level remains a major issue in South Africa and numerous developing countries, particularly those in Africa. South Africa is mostly known as being food secure, both in the production of sufficient staple food and in its ability to import sufficient and nutritional food for its population (FAO, 2008; Masipa, 2017). However, large number of households within the country are food insecure with the high prevalence of undernutrition, high poverty and unemployment rate (Chakona and Shackleton, 2019; Mail and Guardian, 2018). In addition, poverty and unemployment rates are the two leading contributors to food insecurity among households.

Existing studies on food security are commonly grouped into two categories, namely; 1) food security studies (Aliber and Hart, 2009, Altman *et al.*, 2009; Hendricks, 2014), according to national datasets such as the General Households Survey, Income and Expenditure Survey, among others, which tend to be general in their approach, and 2) food security studies (D'Haese *et al.*, 2013; De Cock *et al.*, 2013), which have focused on the provincial level and tend to take specific food security measurements whilst ignoring other measures (own food production, access to food markets, etc.) and thus giving an incomplete picture of the extent of food security. Furthermore, a

systematic review of food security studies done by Hendricks (2014), have shown that, although there are many studies on food security, these studies are incomparable as they use different measures. These shores up the notion that the observed results in the previous studies are not viable and therefore, one cannot be able to make conclusive statements. The study incorporated the four components of food security at once to determine food security status of rural households. This approach focused in identifying a specific food security component(s) that is likely to influence food security status. The studies done in Limpopo Province did not implement the four components of food security.

This, therefore, calls for holistic studies measuring food security in terms of the four dimensions, namely, food availability, access, utilisation, and stability. This study sought to close the research gap identified in previous studies. Most food security initiatives in the Limpopo Province are limited to Capricorn and Mopani Districts (Nesengani *et al.*, 2016). Consequently, a better estimation of food insecurity at the two districts could be easily made. The next section provides the rationale for the study.

### 1.3. RATIONALE OF THE STUDY

Previous studies on food security in South Africa acknowledge food security at a national level, and not at a household level. Food insecurity at a household level is mainly due to socio-economic pressures, given that most households face challenges of unemployment, depend largely on social grants and have to deal with high food prices, just to mention but a few challenges (Chakona and Shackleton, 2019). In view of this, Masekoameng and Maliwichi (2014) purport that, most rural areas in South Africa are characterised by continuous poverty and food insecurity at household level, which accounts for higher vulnerability to food insecurity in rural settings.

In South Africa, food security only exists at the national level due to commercial farmers' high production, which results in the country being self-sufficient in terms of food production (Department of Agriculture, Forestry & Fisheries [DAFF], 2013). De Cock *et al.* (2013) reported that approximately 53% of rural households in the Limpopo Province were severely food insecure while 15% of rural households were food secure at the household level. This is because some of the rural households in the Limpopo

Province were involved in crop production whilst some did not have arable land or backyard gardens for food production (De Cock *et al.*, 2013). Households that did not have arable land or backyard gardens thus had limited sources of food, which eventually translated into their food insecurity.

Although attempts are being made to fight hunger in South Africa, there is many people who still lack food to sustain an active and healthy life (DAFF, 2018). The main problem is lack of economic resources, which in and of itself inhibits social and physical access to food and adequate nutrition at the household level (Fisher, 2018). Therefore, improvement in agricultural productivity should increase rural households' income and access to food. However, such an improvement in agricultural productivity should not only be limited to or measured at a national level; it should also be notable at a household level (DAFF, 2018).

Nyathela and Oldewage-Theron (2017) noted that South Africa is still regarded as being food secure; however, rural areas are still affected by food insecurity and malnutrition at a household level. In addition, given the status of food security at the household level, the afore-mentioned four dimensions of food security are currently under-explored in research, resulting in little to no information about food security at a household level.

Comparatively speaking, the levels of poverty between the Mopani and Capricorn Districts are different. Mopani is characterised by a high level of poverty (44.3%) whereas Capricorn District Municipality has a lower level of poverty (8.5%). This study focused on these districts because of their high poverty rates when compared to other district municipalities within the Limpopo Province.

An assessment of food security in a wider context necessitates an assessment of the concept 'food security' considering the four dimensions of food security. This is because the dimensions do not exist in isolation from each other but are dependent on each other. For instance, food utilisation depends on food access, which, in turn, depends on food availability and food stability. This study assumed a holistic approach in that, it addressed the weaknesses of previous studies on the assessment(s) of all the dimensions of food security. This approach will assist rural households of CDM and MDM and the society at large to understand the main components contributing to food security. Despite increased research focus on urban food security, due to rapid

rural-to-urban migration, this study may help to keep the attention on rural areas, which remain important in food security research, particularly in developing countries like South Africa. Furthermore, this study will add to the scant literature regarding each dimension of food security since many scholars botched to address the four dimensions of food security at once. Moreover, the study will help policy makers to understand which dimension is likely to influence food security status and what needs to be done in order to make sure that the rural households are food secure. This study, therefore, analysed food security in terms of the four dimensions of food security among rural households of Capricorn and Mopani Districts.

#### 1.4 AIM AND OBJECTIVES OF THE STUDY

##### 1.4.1 Aim of the study

To analyse food security in light of food availability, access, utilisation, and stability among rural households of Capricorn and Mopani Districts in the Limpopo Province of South Africa.

##### 1.4.2 Objectives of the study

The objectives of the study were to:

- i. Profile the socio-economic characteristics of rural households in the Capricorn and Mopani Districts.
- ii. Assess food consumption patterns of rural households in the Capricorn and Mopani Districts.
- iii. Determine the food security status of rural households in the Capricorn and Mopani Districts in terms of the four dimensions of food security.
- iv. Examine the determinants of food security among rural households in the Capricorn and Mopani Districts.
- v. Identify strategies used by rural households to enhance food security status in the Capricorn and Mopani Districts.

##### 1.4.3 Research hypothesis of the study

- i. Rural households of Capricorn and Mopani Districts are not food secured.

- ii. Socio economic factors do not influence the food security status in the two study districts.

## 1.5 OUTLINE OF THE STUDY

Chapter one: presents the background information of the research study, problem statement, rationale of the study, aim of the study, objectives of the study and lastly, the hypotheses of the study.

Chapter two: reviews relevant literature on the concept and evolution of food security, definition of terms, pillars of food security, levels of food security, food security at a household level, challenges of food security at a household level, positive outcomes on food security, factors influencing food security, rural households' coping strategies against food shortages and the chapter summary.

Chapter three: provides a general overview of food security in South Africa, history of food security in SA, food security status in SA, food security in the urban/rural areas in SA, agricultural production patterns in SA, food consumption patterns, poverty in SA, measures put in place to enhance food security in SA and the chapter summary.

Chapter four: gives the description of the study area, research methodology and analytical procedures used in the study.

Chapter five and chapter six: present the descriptive and empirical results on food security at the Capricorn and Mopani District Municipalities.

Chapter seven: gives the summary of the study, conclusions, and policy recommendations.



## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.0 INTRODUCTION**

To gain deeper and broader insights into the research problem prior to the field study, it is necessary to conduct a literature review. The literature review also allows the researcher to become aware of what is known about the problem and what the current gaps are (Lubbe *et al.*, 2007). The review of related literature also serves the purpose of being a basis for comparison with the current study's results to identify the similarities and differences. This chapter discusses related literature based on the following concepts: (i) the concept and evolution of food security (ii) pillars of food security (iii) levels of food security (iv) food security at a household level (v) challenges of food security at a household level (vi) positive outcomes on food security at a household level and (vii) factors influencing food security, and (viii) rural households' coping strategies against food shortages.

#### **2.1 THE CONCEPT AND EVOLUTION OF FOOD SECURITY**

In the 1970s, the concept 'food security' initially focused on ensuring food availability and the price stability of basic foods, which was due to the extreme volatility of agricultural commodity prices and turbulence in the currency and energy markets at that time (Berry *et al.*, 2015). The occurrence of famine, hunger and food crises required a definition of food security that recognised the critical needs and behaviour of potentially vulnerable and affected people (Shaw, 2007). According to Peng and Berry (2018), the concept 'food security' originated some 50 years ago, at a time of global food crises in the early 1970s, to an extent that some two decades ago, there were about 200 definitions of food security in published writings. The most widely accepted definition of food security has been put forward by the Food and Agriculture Organization (FAO) annual report on food security called "The State of Food Insecurity". FAO defines food security as a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life (FAO, 2002). However, another updated version to this definition materialised at the 2009

World Summit on Food Security, where another dimension called 'stability' was added to the three, *viz.* accessibility, utilisation and availability. Stability was added as a short-term time indicator of the ability of food systems to withstand shocks, whether natural or man-made (FAO, 2009).

This definition by FAO stresses reasonably the need for increased production since protein-energy deficiency in 1970 was believed to affect more than 25% of the global population (United Nation Development Programme, 1994). A better perception of the crises in food security later led to a shift in emphasis from the availability of food to a wider approach. A deeper grasp of the functioning of agricultural markets under stress conditions, and how at-risk populations found themselves unable to access food, led to the expansion of the FAO definition of food security. The definition included vulnerable people securing economic access to available supplies, *i.e.* food (Berry *et al.*, 2015). Again, it has been suggested that over and above these four dimensions (availability, accessibility, utilisation and stability) that, another dimension – sustainability, be added as a fifth dimension to encompass the long-term time dimension (Peng and Berry, 2018).

## 2.2 PILLARS OF FOOD SECURITY

In its definition of food security, the World Summit used the phrase, “four pillars of food security”, referring to the four dimensions of food security, namely: availability, accessibility, utilisation, and stability (FAO, 2009). However, the visualisation of pillars gives a rather misleading representation of the concept since the four dimensions are surely interrelated and interdependent, rather than static and separate.

Subsequently, as the four dimensions of food security have been identified according to the definition, the four pillars have been further clarified as; 1) Availability of food produced locally and imported from abroad. 2) Accessibility of the food that can reach the consumer (transportation infrastructure), with the latter assumed to have enough money for purchase. To such physical and economic accessibility is added socio-cultural access to ensure that the food is culturally acceptable and that social protection nets exist to help the less fortunate. 3) Utilisation - the individual must be able to eat adequate amounts both in quantity and quality in order to live a healthy and full life to realise his or her potential. Food and water must be safe and clean, and thus

adequate water and sanitation are also involved at this level, and 4) Stability - deals with the ability of the nation/ community/(household)/ person to withstand shocks to the food chain system whether caused by natural disasters (climate, earthquakes) or those that are man-made (wars, economic crises). Thus, food security exists at a number of levels. For instance, food availability may be viewed at a national level; food accessibility may be viewed at a household level; food utilisation may be viewed at an individual level, whereas stability may be considered as a time dimension that affects all the levels. All these four dimensions must be intact to ensure full food security.

## 2.3 LEVELS OF FOOD SECURITY

Universal indicators for measuring food security are challenging. They need to be widely accepted as correct, reasonably objective and homogeneous across time and space. Different indicators may be applied to different levels of food security. The levels of food security (global, national, provincial, and household) are explained as follows:

### 2.3.1 Global Food Security

According to Berry *et al.* (2015), suitable indicators of global food security must be reliable, repeatable, and available for the majority of countries of the world. However, there is generally no acceptable agreement as to what the optimal indicators of food security are. Nonetheless, the measurement of food security over the years by FAO was mostly based on energy deprivation and protein deficiency. FAO used the parametric indicator which shows the prevalence of undernourishment to monitor the food security in the world. The annual, "The State of Food Insecurity in the World" report from FAO is considered the official release of information on food insecurity worldwide. It has been reported (by the International Fund for Agricultural Development [IFAD], 2012) that, the prevalence of undernourishment remains one of the few indicators available with wide coverage and comparability across time and space. It has been well recognised that as a standalone indicator, the prevalence of undernourishment is not able to capture the complexity of all the dimensions of food security and that a more comprehensive approach to the measurement is required in order to have a global homogenous and accurate indicator.

Table 2. 1: State of World Food Security

FAO suite of indicators for food security 2013

Food security domain	Indicators for food security
<hr/>	
Level	
Availability	Average dietary energy supply adequacy
National Level	Average value of food production
	Share of dietary energy supply derived from cereals, roots and tubers
	Average protein supply
	Average supply of protein of animal origin
<hr/>	
Accessibility	Percentage of paved roads over total roads
Household Level	Road density
	Rail-lines density
	Domestic Food Price Level Index
	Prevalence of undernourishment
	Share of food expenditure of the poor
	Depth of the food deficit
	Prevalence of food inadequacy
<hr/>	
Utilisation	Access to improved water sources
	Access to improved sanitation facilities
	Percentage of children under 5 years of age affected by wasting
	Percentage of children under 5 years of age who are stunted
	Percentage of children under 5 years of age who are underweight
	Percentage of adults underweight
<hr/>	
Stability/Vulnerability	Cereal import dependency ratio
	Percent of arable land equipped for irrigation
	Value of food imports over total merchandise exports
	Political stability and absence of violence/terrorism
	Domestic food price level index volatility
	Per Capita food production variability
	Per Capita food supply variability

Adapted from: FAO, World Food Programme [WFP] and International Fund for Agricultural Development [IFAD] (2012). *The State of Food Insecurity in the World 2013: The Multiple Dimensions of Food Security*. Rome: FAO.

### 2.3.2 Food Security at National Level

The ability of the country to produce food depends on its resources' endowments, policies, the productivity with which the available resources are employed as well as climate (Carletto *et al.*, 2013). According to Matebeni (2018), the ability to import food depends on a country's national income, the availability of foreign exchange, and the conditions and prices on international markets. Therefore, if the above-mentioned components are not favourable within a country, food shortages are likely to be experienced and ultimately result in food insecurity for a country. This also triggers food aid to be an external addition or emergency addition to national food supply when it is needed (Carletto *et al.*, 2013).

Jacobs (2009) opined that, the country's food security condition is considered to be food secure when it produces sufficient amounts of staple foods, and has the ability to import food where required to meet the nutritional needs of its citizens. For instance, when analysing food availability in the context of South Africa, several studies (Altman *et al.*, 2009; De Cock *et al.*, 2013; D'Haese *et al.*, 2013) confirm that, South Africa is food secure at a national level and produces sufficient food for its citizens, whereas at the household level, the food security status is deplorable. The results of the global food security index also confirm that South Africa is in a good environment when compared with other countries such as Thailand, Egypt, Botswana and Ghana, to list a few, as South Africa ranks 47<sup>th</sup> in the 2016 index (Economist Intelligence Unit [EIU], 2016). This simply means that South Africa can compete with other countries at a global level in terms of food availability (Matebeni, 2018).

Hendriks (2014) explains that political uncertainty, global price volatility, high input prices and agronomic factors also put South African agriculture under strain regarding production outputs. Greyling *et al.* (2015) also agree that the production of food in South Africa remains risky and is highly connected to local and global influences like climate change. For instance, the South African agricultural sector represented only 2.3% of the economy in 2013 and has declined in the economy since 1994. This was

due to the relatively faster growth of the non-agricultural sectors, which expanded by 41.5% during 2014 (Greyling *et al.*, 2015). Concerning the structure of South African agriculture, there are “two agricultures” in South Africa, namely, commercial farming and smallholder farming. The first type of agriculture is characterised by highly developed, white-owned and technologically advanced commercial farms. This structure consists of 40 000 farmers who produce most of the marketed agricultural produce. About 1.3 million households have access to land for farming purposes. Smallholder farming, also known as traditional agriculture, is estimated to have 97% of these households engaged in some farming activity, mostly on relatively small plots (Vink and Van Rooyen, 2009).

### 2.3.3 Food Security at Provincial Level

Food security at the provincial level is further sub-divided into rural and urban areas food security.

#### 2.3.3.1. Food Security Status in Limpopo Province

Limpopo Province is among the provinces which are characterised by high poverty levels when compared to Eastern Cape and KwaZulu-Natal Provinces (Food Agriculture Organisation [FAO], 2017). These provinces are classified as predominantly rural and with high levels of poverty, yet they are the provinces which acknowledge the highest proportion of households involved in agricultural activities (Statistics South Africa, 2019). For instance, Limpopo Provinces accounts for (25%), Eastern Cape (20%) and KwaZulu-Natal (20%) of agricultural activities in South Africa (Statistics South Africa, 2019). The Limpopo Province government-initiated food security projects in order to help alleviate poverty within the province. However, there have been demonstrated unsustainability and difficulties faced by these projects in their efforts to create jobs and alleviate poverty (Nesengani *et al.*, 2019). As a result, a vast number of households were and are left vulnerable to food insecurity shocks, especially in rural areas. Nesengani *et al.* (2019) further articulate that, although citizens of the Limpopo Province depend in one way or another on farming as a way of living, food security projects are battling climate change that affects production, which ultimately affects food security in the province.

Documents from the Department of Health, Social Development, and the Department of Agriculture in the Limpopo Province have shown that there were 138 food security projects in all the districts of the Limpopo Province (Nesengani *et al.*, 2019). However, Nesengani *et al.* (2019) discovered that there are actually 347 food security projects in the province, of which 338 were declared functional. Among the district municipalities found in the province, Mopani District was found to be with the most food security projects (184). Vhembe District was found to be the second district with most food security projects with 57. Capricorn District had 55 food security projects, followed by Sekhukhune and Waterberg with 39 and 23 food security projects, respectively. This may mean that district municipalities with highest number of food security projects have chances of improved food security status. This is because, Mudau and Netshandama (2012) aver that, the main goals of having food security projects within provinces was to increase household food production and trading; improve income generation and create job opportunities; improve nutrition and food safety; increase safety nets and food emergency management systems; and lastly, provide capacity building.

Given the background information on the household food security status in the Limpopo Province, it is a cause for concern that there are minimal reviews on food insecurity at a household level in the province. The minimal reviews focus mainly on the food security status at a provincial level rather than at a district level and a household level, respectively. Recent studies conducted in the Sekhukhune District Municipality by Masekoameng and Maliwichi (2014) and FAO (2016) reveal food insecurity in the Sekhukhune District. This denotes a possible lack of attention to other districts concerning the food security status of households in the province. Therefore, the study examined households' food security status among rural households of Capricorn and Mopani District Municipalities as a way of bridging the gap and ensuring availability of information on the food security or lack thereof within these districts. The researcher took into cognisance De Cock *et al.* (2013)'s observation that the Capricorn and Mopani District Municipalities are among districts that are affected by food insecurity within the Limpopo Province.

In light of the foregoing information and reviews, one may conclude that, there is minimal information on household food security in the Limpopo Province, and where

information exists, such information mainly focuses on the provincial level. Furthermore, available information on food security on district municipalities focused on the Sekhukhune District Municipality, which served as a springboard of the present study of the Capricorn and Mopani District Municipalities.

#### 2.3.4 Food Security at Household Level

Maxwell *et al.* (2013) abridged several categories of indicators of household food security, which have shown their cross-contextual application.

##### 2.3.4.1 Dietary Diversity and Food Frequency

This category of indicators usually captures the number of different kinds of foods or food groups that people consume, and the frequency of consuming them. The result is a score, showing the diversity of diets. The Food Consumption Score [FCS] and the Household Dietary Diversity Score [HDDS] are two common indicators measuring dietary diversity (Maxwell *et al.*, 2013; Swindale and Bilinsky, 2006; FAO, 2010).

##### 2.3.4.2 Spending on Food

People who represent a greater proportion of expenditure on food have been considered less secure in terms of household food security (Maxwell *et al.*, 2013; Smith *et al.*, 2006).

##### 2.3.4.3 Consumption Behaviours

This category of indicators measures behaviours related to food consumption, thus capturing food security indirectly. The most widely known indicator in this category is the Coping Strategies Index [CSI], with a shortened version of “reduced CSI” [rCSI] (Maxwell *et al.*, 2008).

##### 2.3.4.4 Experiential Indicators

Household Food Insecurity Access Scale [HFIAS] and a culturally invariant subset of HFIAS-Household Hunger Score [HHS] capture household behaviours signifying insufficient quality and quantity. Some international organisations, including USAID and FAO, have adopted and promoted the HFIAS and HHS (Maxwell *et al.*, 2013). Recently, the Voices of Hunger or Food Insecurity Experience Scale [FIES] has been used in worldwide surveys (FAO, 2018).



#### 2.3.4.5 Self-Assessment Measurement

Introduced in recent years, and used by Gallup Poll (Headey, 2011), self-assessment measures are highly subjective in nature and perhaps too easy to manipulate in a survey. It is widely accepted that all these indicators represent some aspects of the multidimensional nature of food security. However, no single indicator captures the complete picture of household security. In addition to categorising the indicators, Maxwell also compared these measurements and specified the dimensions denoted by each indicator (Maxwell *et al.*, 2013).

Another well know indicator is the Household Hunger Scale, which is applied in more severe behaviours (Maxwell *et al.*, 2013).

### 2.4 CHALLENGES OF FOOD SECURITY AT HOUSEHOLD LEVEL IN SOUTH AFRICA

According to Altman *et al.* (2009), South Africa is said to be food secured at a national level, although numerous households within the country are categorised as food insecure. The FAO (2020) reports that climate shocks and economic slowdowns and downturns are the main drivers that lead to the prevalence of food insecurity in South African households. The SADC Report (2019) also reports that the current food and nutrition insecurity in South Africa are instigated by adverse weather-related shocks, particularly the extreme flood which occurred in the previous seasons combined with other rapid onset livelihoods disturbances. As a result, about 20% of South African households are estimated to have inadequate or severely inadequate access to food (Statistics South Africa, 2014). Also, the 2005 household survey indicated that about 52% of South African households were food insecure, 33% people were at the risk of hunger and only 20% were food secure (Chopra *et al.*, 2009; Labadarios *et al.*, 2009). This reveals that most households and individuals in South Africa are highly susceptible to food insecurity shocks. In the Limpopo Province, for example, approximately 52% of rural households are categorised as severely food insecure (De Cock *et al.*, 2013).

Chopra *et al.* (2009) mentioned that there is a strong relationship between food insecurity and household socio-economic status. These socioeconomic traits included income, employment status and food expenditure. Therefore, a total household

income becomes significant in achieving food security (Shisanya and Hendriks, 2011; Hendriks, 2014), and given the high poverty level, it is difficult for most South African households to purchase enough food to feed the entire household (Statistics South Africa, 2018).

A report provided by Mail and Guardian (July 2020) declares that food security is a national crisis in South Africa. To be precise, the South African National Health and Nutrition Examination Survey [SANHNES] discovered that, in urban areas, 28% of households were at the risk of hunger while 26% were already experiencing hunger. In rural communities, these statistics hit 32% and 36%, respectively. The SANHNES further argues that food security is more than just bringing the meal on the table, but also entails a variety of factors that include malnutrition, obesity, hunger seasons and low dietary diversity (Mail and Guardian, July 2020).

Andy du Plessis, managing director of Food Forward South Africa [FFSA], told Mail and Guardian in July 2020 that poverty and unemployment are two leading factors that trigger food insecurity and that, these factors remain both complex to unpack and understand. This is exacerbated by housing issues, quality of education and social problems that are not being addressed, which further proliferate food insecure households and individuals. Currently, it is estimated that about 50% of the South African population is food insecure or at a risk of food insecurity (FFSA, 2020). This implies that people are hungry or at the risk of hunger, skipping meals or going for days without food to survive (FFSA, 2020). Statistics South Africa (2019) established that people who are vulnerable to food insecurity live in poverty-stricken households that lack money to buy food and are unable to produce their own food. Such households are inhibited by the inability to secure employment or to generate income, thus translating into poor households which are typically characterised by few income-earners, many dependents and are predominantly vulnerable to economic shocks (Statistics South Africa, 2019).

Looking at the outbreak of the COVID-19 pandemic, President Cyril Ramaphosa declared a National State of Disaster with countermeasures on 15 March 2020. This was followed by a national Lockdown (people to stay at home) order issued on 23 March 2020, which was to be effective for three weeks from 27 March 2020. The lockdown was ordered to buy time to develop and implement a long run response to

the COVID-19 pandemic. The initial three weeks was afterward extended to five weeks, scheduled to end on 03 April 2020. This has left several households and individuals struggling to earn an income to feed their families. This was because, the lockdown came with robust restrictions that prevented individuals from leaving their homes, except under exceptional circumstances. Consequently, people were not allowed to go to work, unless employed in an essential sector, and were restricted in how and where they could spend their income. Closing non-essential industries led to declines in production and large numbers of workers being laid off. Arndt *et al.* (2020) states that during the lockdown period, households with low levels of educational achievement and high dependence on labour income experienced and continue to experience a massive real income shock that is clearly threatening the food security of these households. The effect is mainly the result of the lockdown policies imposed by South Africa to contain the novel Coronavirus in the country, leaving a vast number of households and individuals at a greater risk of food insecurity.

## 2.5 POSITIVE OUTCOMES ON FOOD SECURITY AT HOUSEHOLD LEVEL

In South Africa, there are various strategies and programmes that are put in place to curb food insecurity. These strategies include government social grants, government food parcels, and school feeding programmes, to mention a few. Despite the implemented strategies, the need to access arable land still surfaces, because it has the potential to enable both households and individuals to produce their own food and can ultimately lower chances of food shortages. According to Mail and Guardian (July 2020), access to land may be an argumentative issue, but it is a remedial intervention that has the potential to transform some of the challenges faced by South Africans who do not have easy access to food or funds. This is because, rural and urban households' involvement in agricultural activities such as subsistence farming can reduce their susceptibility to hunger and food insecurity (Statistics South Africa, 2019).

Farmers Weekly (2012) reports that the eradication of hunger and malnutrition is the biggest and continuous challenge in South Africa. The DAFF (2011/2012) argues that eradication of hunger and malnutrition cannot be achievable only through the aforementioned strategies. The DAFF posits that the eradication of hunger and malnutrition can be achieved through the addition of other critical factors such as improved feeding programmes and further policy development concerning food security issues in South

Africa. For instance, the FFSA supports 600 beneficiary organisations and distributes around 4 400 000kg of food, feeding 250 000 people a day as way to lower food insecurity in the country (FFSA, 2020). The FFSA is a non-profit organisation that builds a bridge over the gap between South Africa's staggering food waste and equally staggering food insecure population.

It is not only just FFSA that is making steps in changing the face of food security in South Africa, but there are also other programmes that were developed particularly for the unemployed youth/people and children since previous reviews reported this populace as the most vulnerable to food insecurity shocks. This is because not everyone in South Africa is deemed ideal to receive social grants. Therefore, the Public Works Programme and Community Works Programme were developed to assist households to secure household income (Statistics South Africa, 2014). This intervention has saved numerous households from hunger since income for a household is a significant factor that determines the food security status of a household (Farmers Weekly, 2012). To accommodate children in addressing food insecurity, the South African government introduced school feeding programmes as an essential long-term solution (FAO, 2020). The school nutrition programmes have been successful in ensuring that millions of children receive at least one nutritious meal a day (FAO, 2020). Also, Statistics South Africa (2018) confirms that households that practice subsistence agriculture are likely to be food secure. Given the declining role of agriculture in the South African economy and the low occurrence of smallholder agricultural production when compared to other African countries, it is evident that households which are engaged in some form of subsistence agriculture were more likely to be food secure than those that did not engage (Statistics South Africa, 2018). This is true to some extent since the government is highly promoting subsistence farming to lessen food insecurity. Furthermore, the government has introduced and implemented many agricultural programmes as a strategy to address food insecurity, particularly in rural communities.

Currently, as the COVID-19 pandemic persists, disruptions in domestic food supply chains, other shocks affecting food production, and loss of incomes and remittances are causing strong strains and food security risks in many countries (World Bank, 2020). In South Africa, the primary risks to food security are on the higher side since

most people lost their jobs even before the outbreak of the Coronavirus in the country. To curb food insecurity, the government has introduced a social relief grant ideally for unemployed citizens and residents of South Africa during the pandemic. Regardless of the challenges brought by the Coronavirus, agricultural activities were kept safely running as an essential business so that markets could be well supplied with affordable and nutritious food. Therefore, consumers were still able to access and purchase food despite movement restrictions and income losses. In addition, on the 24<sup>th</sup> of April 2020, President Cyril Ramaphosa announced five levels of opening the economy besides the agricultural industry within the country, with such an opening accompanied by different restrictions. The main aim of opening other business sectors was to allow people to go back to work, so that they could retain their jobs and prevent losses of income. This afforded such individuals the opportunities to be able to feed their families.

## 2.6 FACTORS THAT INFLUENCE FOOD SECURITY

Zhou *et al.* (2019) noted that food security has many dimensions. Such dimensions ranged from global, regional, national, local and household to individual levels. The determinants of food security differ across all these levels. This is because food security is a multidimensional phenomenon, encompassing climate change, civil conflicts, natural disasters, and social norms (Zhou *et al.*, 2019). In addition, there are various factors responsible for food security. These include supply side factors, demand side factors, and market related factors, to mention a few. For instance, at the national level, food insecurity may be analysed in terms of production, supply and demand deficits. On one hand, the socio-economic characteristics of households are crucial in determining household food security (Zhou *et al.*, 2019). The World Bank (2001) has recognised the availability of food, accessibility of food and utilisation of food as the three factors which affect food security. Previous researchers omitted food stability as a component of food security, hence, the aim of this study was to analyse food security using all the four components of food security. It is important to divide the factors affecting food security into their socioeconomic, institutional, and environmental factors. For this reason, each factor is discussed below in view of how it affects food security.

### 2.6.1 Socio-economic factors

Bashir *et al.* (2013) conducted a study that focused on the impact of socio-economic characteristics of rural households on food security in Pakistan. The aim of the study was to highlight the severity of food insecurity in rural areas. The study assessed food security using the calorie intake method. The data was collected through a comprehensively designed interview that recorded different parameters of household food shortage from 12 districts of Pakistan consisting of 1152 households. Food shortage was used as a proxy to measure food security. Furthermore, socio economic correlates from the data were identified by analysing cross-tabulations and running  $X^2$  tests. The results showed that 23% of households were food insecure whilst about half of the households were found to be severely food insecure. The results of the study further indicated that, several factors play a significant role in household food security. These factors included livestock assets, monthly income, family size, family structure, household head's age and educational levels. These factors were ranked for their importance to food security with livestock assets and monthly income being the most important factors that positively influenced food security of households. To estimate food security for households, a 7-day recall of food consumption was used. This method was not viable for the purposes of the study, given that the Household Food Insecurity Access Scale [HFIAS] would have given a better estimation of food security status as it focuses more on food availability, access, and utilisation. Again, Household Dietary Diversity Score [HDDS] would have yielded a better estimation as the index estimates how diverse the household's diet is. A similar study was conducted by Esturk and Oren (2014), which focused on the impact of household socioeconomic factors of food security. Food security was measured using the Household Food Security Survey Measure Model [HFSSMM]. The HFSSMM focused on the insufficient amount of food or nutritious food due to lack of money. This model is easy to use and still gives viable results when estimating food security. The model consists of 18 questions intending to measure the prevalence of food insecurity in households and the severity of hunger (Kennedy, 2002). Households' food security levels and socio-economic factors affecting food security were analysed using the ordered logistic regression technique. The results of the study concluded that income level, gender of household head, employment status, education level and household count were variables affecting food security. Esturk and Oren's (2014) study was comparable to

that of Bashir *et al.* (2013) in that, the results for both studies were similar and the methods used were viable to estimate the factors affecting food security. For this reason, both of these studies used the relevant methods to estimate factors of food security. In addition, HFSSMM is the same as HFIAS, the only difference is that it includes nine questions for households with children and nine food insecurity questions, which gives the total of 18 questions, both consisting of occurrence questions.

A study conducted by Zhou *et al.* (2019) aimed to examine factors influencing household food security in rural areas of Pakistan by collecting quantitative data through a structured questionnaire. The study used descriptive statistics to describe the characteristics of households in relation to their food security status and to examine the determinants of food insecurity. A Binary Logistic Regression analysis was used. The results of the study revealed that age, gender, education, remittances, unemployment, inflation, assets, and disease are the important factors determining food insecurity. The analytical tool used to measure food security status is not viable because descriptive statistics alone was not enough. This was because the Household Food Insecurity Access Scale is able to better estimate food security status because it focuses on food availability, accessibility, and utilisation of household. Ngema *et al.* (2018) and Zhou *et al.* (2017) conducted similar studies, although Ngema *et al.* (2018) used a different method to estimate the factors influencing food security status. Ngema *et al.* (2018) aimed to estimate the determinants of household food security status in Kwazulu-Natal [KZN]. Food security status was estimated using HDDS together with the Household Food Consumption Score [HFCS]. Thereafter, a Binary Logistic Regression Model was used to determine factors influencing household food security. Regression estimates established that education, receiving infrastructural support and participation in the 'One home, one garden' programme positively influenced households' food security status. Looking at the indexes that were used to estimate food security, the study could have included HFIAS to make food security status estimation more viable. This is because HDDS and HFCS mainly focused on how diverse the households' diet was and households' food consumption while omitting the most important components, namely, food availability, food stability and food utilisation.

Sekhampu (2013) investigated the food security status of households in Bophelong at the Gauteng Province in South Africa. The data was collected based on monthly household expenditure on food and non-food items. Several statistical methods were used to analyse the data, including through the use of the food security status estimation and logistic regression analysis. Also, the food security poverty line was used to aggregate households into food secure and insecure, respectively. Each household's total monthly food expenditure was compared with a household's specific food poverty line based on household size, gender, and age distribution of the household members. The results of the study show that, household size, age, employment status, gender, marital status of the household head and household income are significant predictors of food security. In addition, household income is an important factor as it determines how much can be spent on various needs of the household. Ndobu (2013) obtained similar results in a study that sought to determine the food security status of households. Data was collected using a self-administrated questionnaire. The Household Food Insecurity Access Scale was used to determine the food security status of households and Logit Regression Model was then used to estimate socio-economic variables that determine food security status. From the observed results, gender, income of households, marital status and household size were found to significantly predict the food security status of households. The methods used in this study were viable. However, to obtain a representative picture of food security status, food indicator such as HFIAS and HDDS should have been included.

#### 2.6.2 Institutional factors

Ngema *et al.* (2018) conducted a study in Maphumulo Local Municipality, South Africa. The study focused on household food security status and its determinants. Data was collected using a questionnaire. The study used HDDS and HFCS, where The Household Food Consumption Score was estimated using a typical seven-day food dataset by categorising food items into food groups and subsequently adding the consumption frequency of food items belonging to that group. A Binary Logistic Regression was then used to estimate factors influencing food security status. The results of the study revealed that, receiving infrastructural support and participation in the 'One Home One Garden' programme have positively influenced the food security status of household, whilst household income and access to credit showed a negative



correlation. The One Home One Garden programme was developed and promoted by Department of Agriculture Forestry and Fisheries (DAFF). It is a food security intervention programme aiming at achieving household food security stability by producing some food for consumption purposes with a long-term goal of producing enough food to sell at local markets. The Department of Agriculture and Environmental Affairs (DAEA) in 2018 estimated that 580 000 households in KwaZulu Natal were food insecure. As a means to address this widespread problem, the DAEA embarked on the One Home One Garden intervention programme. The aim of the One Home One Garden intervention programme was to distribute seeds and fertilizer packs to households. Furthermore, the South African government continues to support rural farmers with garden inputs, infrastructure, training and mentoring with the aim to boost household production through the One Home One Garden Campaign. This has encouraged household gardens throughout the KwaZulu Natal Province.

Riely *et al.* (1999) considered knowledge of the household about food storage, processing, nutrition and management of illness as among the institutional factors that determine food security in the food security indicators and framework for use in the monitoring and evaluation of food aid programmes. The purpose of the guide was to assist in the identification of food security indicators to be used when monitoring and evaluating food aid programmes. The study conducted in Nigeria by Abu and Soom (2016) also highlighted that lack of access to credit facilities, storage and processing crises/war influenced rural households' food security. In consensus, Gundersen and Gruber (2001) also noted that lack of access to credit has a negative influence over food security.

### 2.6.3 Environmental factors

Abu and Soom (2016) conducted a study which examined factors affecting household food security status among rural and urban farming households of Benue State in Nigeria. The data was collected through a questionnaire and analysed using descriptive statistics, various food security indexes which included food security index, food insecurity gap, calorie intake and Probit Model. Using calorie intake, the results revealed that about 53.3% and 62.2% of rural and urban households were food secured. The results further revealed that, infertility of the soil, unfavourable weather/climatic conditions, poverty, and lack of non-farm income were the major

constraints affecting household food security in the study area. The method used by this study was viable, as it was able to address the aim of the study. However, HDDS would have made a better estimation as it focuses more on different food groups households might have consumed. A research conducted by Beyene and Muche (2010) examined the determinants of household food security among rural households in the Ada Berga District in central Ethiopia. The study found that, variables related to experiences in farming activities, off farm, land and livestock holdings (Ali and Khan, 2013), as well as soil and water conservation practices and non-farm incomes, significantly affect household food security. Bogale (2012) examined the factors which determine the household level of susceptibility to food insecurity by using the method of expected poverty approach. Data was obtained from 277 randomly selected households in Ethiopia. The food insecurity of households was associated with many factors, including cultivated land size, the fertility of the soil, irrigation access, fertilizer use and improved seed.

## 2.7 RURAL HOUSEHOLDS COPING STRATEGIES FOR FOOD SHORTAGES

Farzana *et al.* (2017) noted that in connection to food insecurity, the adaption of new technologies or alteration of regular behavior is executed, and it translates to coping strategies. Households generally adopt these strategies to cope with the crisis of having limited or absent resources to acquire food (Maxwell *et al.*, 2008). Kyaw (2009) highlighted that households adopt coping strategies at the early stages of food insecurity. In addition, Kyaw (2009) also indicated that food insecure households reportedly show a range of coping strategies that reflect their vulnerability. Furthermore, households adopt a series of coping strategies, and these can be distinguished as food and non-food-based techniques (Farzana *et al.*, 2017). There are different coping strategies that households employ to cope with the crisis of food shortage or food insecurity. The coping strategies include purchasing less preferred food, reducing meal size, consuming only starched food, skipping meals, selling of assets, borrowing food and money, and buying food on credit (Fintrac Inc, 2014; Gundersen and Ziliak, 2014; Farzana *et al.*, 2017).

Rural households experience food shortages at different levels and households tend to use different strategies in times of food scarcity (Chakona and Shackleton, 2017; Chakona and Shackleton, 2019). The study conducted by Matebeni (2018) looked at

the strategies that households employed to address food shortages at the household level. The study concluded that the most common used strategies by households were buying food on credit, reducing food intake and exchanging one type of food for another. Furthermore, the study conducted by Chakona and Shackleton (2017) noted that participants also agreed to reducing the number of meals and portions, gave food to young children first when serving, reduced diet from good quality and diverse to poor quality monotonous diet, received food parcels every month from the government, converted farms into timber plantations to earn income from selling timber and subsequently using the money to buy food. These were some of the strategies that households implemented to cope with food shortages. The study conducted by D Haese *et al.* (2011) also indicated that there are common strategies used to overcome food shortages in the Limpopo Province. These strategies included borrowing food from relatives, friends and neighbours, reducing food intake, limiting or reducing portion size, buying food on credit, skipping meals for an entire day, selling livestock and restricting consumption in favour of children. Thus, the foregoing studies confirm that rural households have common strategies they use to mitigate food insecurity.

## 2.8 CHAPTER SUMMARY

In summary, the food security status of rural households may be influenced by several socio-economic, environmental, and institutional factors. These also include access to credit. A review of literature on food security or lack thereof suggests that further research is required to understand some of the factors affecting rural households at a district level, as food security affects rural households at different levels. These levels include food security at a global level, food security at national level, food security at household level and food security at an individual level, etc. It was also noted that previous reviews mainly focused on the food security status at a provincial level rather than a district level. Moreover, some scholars mainly focused on one pillar of food security instead of addressing all four dimensions that characterise the measurement of a household's food security status. Therefore, there is a need to analyse the food security status of rural households of Mopani District Municipality and Capricorn District Municipality using all four components/pillars of food security.

## **CHAPTER THREE**

### **OVERVIEW OF FOOD SECURITY IN SOUTH AFRICA**

#### **3.0 INTRODUCTION**

This chapter gives an overview of food security in South Africa based on the preceding reviews on the subject matter.

#### **3.1 HISTORY OF FOOD SECURITY IN SOUTH AFRICA**

The term food security was only developed in the 1970s. Food security has played a significant role in policy developments which have shaped the history of South Africa from the 17<sup>th</sup> century (Hendriks, 2014). Due to changes in international understanding of food security over the past decades, South African food security determinants have been interpreted differently by different ruling authorities and governments over three centuries (NDA, 2002). However, the Natives Land Act of 1913 played a significant role in determining the food security framework of South Africa in terms of the character, composition and contribution of the agricultural sector, shaped consumption patterns and determined rural livelihoods (NDA, 1998). Furthermore, according to NDA (2002), food security has been a part of Section 27 Constitutional rights in South Africa. This means that every South African citizen has the right to have access to enough food and water, where the country by its legislation and other measures with its available resources, avail to the progressive realisation of the right to enough food (NDA, 2002). To make this possible, in 1994, the Reconstruction and Development Programme [RDP] was developed, aiming at prioritising food security in South Africa (Statistics South Africa, 2018). This was implemented by prioritising public expenditure which focuses on improving food security conditions, particularly for disadvantaged people within the country (Statistics South Africa, 2018).

The Department of Agriculture, Forestry and Fisheries [DAFF] is responsible for developing agricultural policies and initiate support programmes to ensure that South Africans can produce their own food and reduce food insecurity (Statistics South Africa, 2019). Thus far, the South African government has played a significant role to endorse food security and to domesticate international indicators on food security to monitor development in different organs of the country (Statistics South Africa, 2019). For instance, an inter-ministerial National Food Security and Nutrition Plan [NFSNP]

has been developed by the South African government and its coordination occurs at the Presidency level. Also, the country's National Development Plan [NDP] recognised agricultural productivity and rural development among the essential priorities for the creation of employment, economic growth, reducing poverty and as a way of curbing food insecurity in South Africa (Statistics South Africa, 2017).

According to SADC Report (2019), SADC RVAA System's estimates of the population susceptible to food insecure in the Southern African Region between the period of October 2019 and May 2020 was reviewed upwards by 5% from the 42.2 million to 43.4 million in all the 13 Member States of the Southern African Development Community [SADC]. The SADC report further states that the most vulnerable populace to food insecurity within the region is predominantly the poor with limited means to cope with shocks; with children, women and the elderly being the most severely affected. Currently, from the review that was done in the Southern African Region, South Africa is projected to have the largest number of food insecure people at 13.7 million. This represents about 24% of the country's population. The chronically food insecure people in the population are already beneficiaries of domestically funded social protection (Government social grants) and safety net programmes (SADC, 2019). Similarly, Devereux (2017) also argues that currently, there is no significant influence of social grants to household food security as the money would not be enough to cater to all household members as well as all the household needs, including food. Recently, Chakona and Shackleton (2019) also accentuate that social grants alone is not enough to eradicate food insecurity in South Africa.

### 3.2 FOOD SECURITY STATUS IN SOUTH AFRICA

South Africa is said to have a market-oriented agricultural economy that is highly diversified and includes the production of all the major grains (except rice), oil seeds, deciduous and subtropical fruits, sugar, wine, and most vegetables (Export Government, 2019). Livestock production includes cattle, dairy, hogs, sheep and a well-developed poultry and egg industry with value-added activities such as slaughtering, processing and preserving of meat; processing and preserving of fruit and vegetables; dairy products; grain mill products; crushing of oilseeds; prepared animal feeds; sugar refining and cocoa, chocolate, and sugar confectionery, among other food products. In 2018, the agricultural sector contributed approximately 10% to

South Africa's total export earnings at a value of \$11.1 billion (188 569 575 000 ZAR). To be precise, citrus, wine, table grapes, corn and wool accounted for the largest exports by value. South Africa also exports nuts, sugar, mohair, apples, and pears.

The grain industry (barley, maize, oats, sorghum, and wheat) is one of the largest agricultural industries in South Africa, contributing more than 30% to the total gross value of agricultural production. Corn is the largest locally produced field crop, and the most important source of carbohydrates in the Southern African Development Community (SADC) region for animal and human consumption. South Africa is the main corn producer in the SADC region, with an average production of around 12 million tons per annum (Export Government, 2019). In addition, the local commercial consumption of corn amounts to more than 11 million tons, and surplus corn is usually exported thus making South Africa to be self-sufficient regarding corn production. Hence, corn is one of the most consumed staple foods in the country.

South Africa is the only country in the SADC region with significant wheat production. However, in the past 20 years, and especially after the deregulation of the market in 1997, there has been a decreasing trend in the area planted with wheat despite increasing local consumption. Declining profit margins resulted in local wheat farmers scaling down wheat production and switching to other crops like canola, corn, soybeans or increased livestock production. Furthermore, the trend in wheat production has been sporadic over the past 20 years because of unpredictable weather conditions (Export Government, 2019). This explains why South Africa is not producing enough wheat, particularly considering the higher demand for this crop. This is likely to result in food shortages, which may also trigger food insecurity since wheat is one of the highly consumed staple foods within the country.

### 3.3. FOOD SECURITY IN THE URBAN/RURAL AREAS OF SOUTH AFRICA

The fact that food security has four dimensions (Availability; Accessibility; Utilisation and Stability), makes the measurement of food security and policy targeting insecurity to be quite challenging. In South Africa, various methods National Food Consumption Survey [NFCS], Food Insecurity and Vulnerability information and Mapping System FIVIMS], General Household Survey [GHS], the Income and Expenditure Survey [IES], Community Survey [CS], South African Social Attitudes Survey [SASAS] and

Labour Force Survey [LFS] to assess food security at a household level have been used (Labadarios *et al.*, 2009).

Although South Africa is food secure, some individual households remain food insecure, be it in the urban/rural set-up (Integrated Food Security Strategy [IFSS], 2002). Food insecurity differs across urban and rural populations, as do their household characteristics and practices. According to De Cock *et al.* (2013), given the high-income inequality and asset ownership, the South African poverty context is certain. Hence, the effect of policy measures towards reducing poverty and food insecurity, and establishing the link between poverty, incomes and food security are still unclear in areas that were disadvantaged during the apartheid era, making policy targeting difficult.

For instance, following results based on the data collected by De clock *et al.* (2013), in which the researchers used the Household Food Insecurity Access Score [HFIAS] categories, 53 % of the Limpopo rural households were severely food insecure. The Mopani District had the highest poverty rates (50%), while the Vhembe District presented the lowest poverty rates (19 %). The average monthly household income in the area was R3055 (SD: R 4154) and the most important sources were grants, formal income and farm income. Half of the households were involved in agriculture, with poultry, maize, mango and cattle being the most important activities. On another note, the continuous rise in food prices, coupled with an economic downturn have fuelled the widening of poor urban households' food gap. Battersby *et al.* (2009) noted that urban poverty is rising at such an alarming rate in African economies and South Africa has not been spared due to urbanisation. A good example of a South African city being affected by urbanisation is Cape Town. According to data collected by Development Bank of Southern Africa's working paper (2009), Cape Town's rate of household food in security was 80% compared to other cities in South Africa. It was concluded that, urbanisation emanating from rural-urban migration due to poverty in the rural areas was the cause of this high percentage of food insecurity in the city.

It can be noted then that, as people move from rural areas to urban areas (urbanisation) in search of greener pastures, it does not necessarily mean that those people will be food secure in the cities. Crush *et al.* (2011) asserted that, some people who stay in the urban areas of South Africa are suffering from poverty, as there is no

sufficient space in the cities to even plant enough food to feed a small family. However, in rural areas, such an advantage can be available. Crush and Frayne (2010) opine that, rapid urbanisation has produced an 'invisible crises of urban food insecurity as people move from the countryside to seek a better tomorrow to an extent that the municipalities are failing to meet up with the demand for service delivery'.

Many city newcomers face poverty and malnutrition while others with access to small pieces of land make use of the space to grow food. Such space range from rooftops to window boxes, roadsides, riverbanks, and vacant lots. Conversely, people in the rural areas may have access to land, but oftentimes, they lack farming equipment or capital to practise commercial farming (Crush *et al.*, 2011). However, the South African government has established initiatives to curb food insecurity such as public-school feeding schemes, child grants, old age grants, etc.

### 3.4 AGRICULTURAL PRODUCTION PATTERNS IN SOUTH AFRICA

The Department of Agriculture, Forestry and Fisheries (2018) noted that the production of field crops increased by 50.8%. This was mainly as a result of increases in the production of the summer crops, winter crops, oilseed crops and other crops. These summer crops included maize and sorghum, winter crops such as wheat, barley and canola, oilseed crops, i.e. soya beans, sunflower seed and groundnuts. Hay, sugar cane and dry beans are amongst the other crops that contributed to the increase of production (DAFF, 2018). The previous season of the production of maize was noted to have increased by 8.2 million tons (99.7%) and sorghum by 92 960 tons (114,7%). This can mainly be attributed to the favourable production condition, which prevailed at the beginning of 2017 (DAFF, 2018). The production of wheat also increased by 472 087 tons (32.6%), barley by 23 000 tons (6.93%) and canola by 12 000 tons (12.9%) from 2015/2016. Soya beans production increased by 598 370 tons (80.6%), sunflower seed by 69 630 tons (8.9%) and groundnut production by 82 460 tons (41.2%) from the 2015/2016. The production of hay increased by 396 000 tons (8.8%), sugar cane increased by 213 209 tons (1.4%) and dry beans by 36 390 tons (93.3%) from 2015/2016. With the given statistics, it is evident that South Africa is producing enough food for its citizens. However, the problem could be the affordability of the food to the consumers, which could inhibit individuals from purchasing food.



Horticulture production for 2016/2017 decreased by 2.3% from the previous season, which can mostly be attributed to decreases in the production of citrus fruits and subtropical fruit. The production of oranges decreased by 395 061 tons (22.4%), grapefruit by 72 586 tons (18.6%), lemons by 30 068 tons (8.5%) and naartjies by 5 793 tons (13.8%) led to a decrease in the citrus production from 2015/2016. The production of bananas decreased by 113 813 tons (28.3%), pineapples by 12 877 tons (12.3%) and avocados by 4 268 tons (4.9%), which accounted for a decrease in the production of subtropical fruit in the previous season (DAFF, 2018).

Animal production decreased by 0.6%, mainly because of decreases in the number of stocks slaughtered (sheep, pigs, cattle and calves), as well as decreases in the production of wool, eggs and ostrich feathers. The number of sheep slaughtered decreased by 224 668 units (4.4%), pigs decreased by 65 603 units (2.3%), cattle and calves decreased by 58 940 units (2.0%) from 2015/2016. The production of wool also decreased by 8 779 tons (20.2%), ostrich feathers by 40 tons (22.6%) and eggs decreased by 11 242 tons (1.8%), compared to the previous season (DAFF, 2018).

### 3.5 FOOD CONSUMPTION PATTERNS IN SOUTH AFRICA

Food consumption pattern “fundamentally reflects nutritional well-being of individuals and the meal pattern is defined by the culture and food availability” (Prabhat and Begum, 2012:1). Food consumption patterns in South Africa have changed dramatically over the past decades and it is said that they are likely to continue to change over the coming decades (Ronquest-Ross *et al.*, 2015). According to Ronquest-Ross *et al.* (2015), several food-related studies conducted over the last few decades indicate that food consumption shifts in South Africa have been towards a more Western-orientated diet, with nutritional consequences contributing to increased obesity and other non-communicable diseases. The findings in the study conducted by Mathias *et al.* (2013) indicated that food consumption shifts have been towards an overall increase in the daily kilojoules consumed, a diet of sugar-sweetened beverages, an increase in the proportion of processed and packaged food, including edible vegetable oils, increased intakes of animal source foods, and added caloric sweeteners, and a shift away from vegetables. However, the largest shifts in food consumption were observed in soft drinks, sauces, meat, fats and oil. Convenience,

health, nutrition and indulgence were the main drivers of the increase in consumption of packaged foods and beverages (Ronquest-Ross *et al.*, 2015).

Kearney (2010) noted that, food consumption is affected by food availability, accessibility, and choice. Food intake choices are said to be influenced by factors such as season, education, demography, disposable income, government, culture, marketing, religion, ethnicity (Bureau for Food and Agricultural Policy, 2011; Wenhold *et al.*, 2012). Bureau for Food and Agricultural Policy (2013) reported that, in 1994, certain changes like Western-orientated diets occurred in South Africa, which dramatically affected food consumption patterns and will continue to do so, as a result of shifts in food availability, accessibility and choices (Ronquest-Ross *et al.*, 2015).

### 3.6 POVERTY IN SOUTH AFRICA

Research conducted on poverty in South Africa confirms that the rigid poverty stance in South Africa is attributed to former policies of the apartheid regime that claimed racial inequality, segregation, and unsustainable settlement patterns (Bhorat and Kanbur, 2006). However, the Spatial Planning and Land Use Management Act, Act 16 of 2013 restores access to land to the previously disadvantaged and protects major agricultural land and environmental resources (COGTA, 2018).

Furthermore, South Africa ranks among the countries with the highest rate of income inequality in the world and when compared to other middle-income countries, South Africa has extremely high levels of absolute poverty (Altman *et al.*, 2009). In lieu of this, the South African government committed to halving poverty between 2004 and 2014. Thus far, as a way of curbing poverty in the country, in 2017, Statistics South Africa released a report on poverty and inequality trends in South Africa between the years 2006 and 2015. The report indicated that more than a quarter (25.2%) of the population in South Africa was living below a food poverty line (R441 per person per month in 2015 prices) in 2015 compared to almost a third (28.4%) in 2006. Between 2006 and 2009, South Africa experienced an increase in the proportion of people living below the food poverty line rising from 28.4% to 33.5%. This increase was followed by a notable decline of 12.1% points by 2011 to 21.4%, followed by an increase of 3.8% points to 25.2% in 2015 (Statistics South Africa, 2019). The substantial increase in food poverty noted in 2009 is ascribable to the global economic decline that also affected South Africa. Households in the lowest income groups tend to be more

significantly affected by economic shocks compared to households in higher income categories, hence the noteworthy increase in food poverty levels during the economic crisis (Altman *et al.*, 2009).

Previous reviews note that in the last five years, that is, between 2011 and 2015, the South African economy has been driven by a combination of international and domestic factors, which include low and weak economic growth, ongoing high unemployment levels, lower product prices, higher consumer prices (expressly for energy and food), lower investment levels, greater household dependency on credit, and policy uncertainty (Statistics South Africa, 2017). This has resulted in many South African households experiencing economic pressures thus ultimately pulling more households and individuals down into poverty. To be precise, the Limpopo Province was one of the enlisted provinces within the country that experienced drastic poverty during the period of 2011 and 2015 (Statistics South Africa, 2019). The population group that was sized to be mostly affected by poverty included black Africans, females, people from rural areas, and those with little or no education (Statistics South Africa, 2017). Statistics South Africa (2018) further argues that labour market incomes, education, gender and race are important drivers of poverty and inequality in South Africa, although education and labour market incomes have grown in importance while gender and race have declined, contributing more than 90% of the overall Gini coefficient between 2006 and 2015.

Given this information, about 2.3 million South Africans managed to escape poverty between 2006 and 2015, as the poverty rate, measured at the national lower-bound poverty line of ZAR 758 per person per month (April 2017 prices), fell from 51 to 40% during this period (Statistics South Africa, 2018). In this regard, not only poverty rates were noted to decrease since apartheid, but it was also highlighted that poverty is becoming less severe (based on the poverty gap, a measure that is calculated as the mean difference between consumption expenditure of each household and the poverty line) and less unequal (based on the squared poverty gap which builds on the poverty gap and gives more weight to the very poor by squaring the poverty gap) (Statistics South Africa, 2018).

Currently, with the prevalent COVID-19 pandemic, which does not strike only at a national level but also globally, many households and individuals are pulled down into

extreme poverty, making such households victims of the economic uncertainties that the pandemic brought. A report by Business Live (2020) explicates that, while COVID-19 can infect anyone, it has been noted that other countries, social and race groups are likely to experience both the virus and its upshots differently. Emerging evidence from the United States and United Kingdom was captured indicating that poorer communities are more likely to be adversely affected by the pandemic (Business Live, 2020). Business Live (2020) further reports that, with South Africa widely acknowledged as one of the most unequal countries in the world, SA is likely to be highly impacted by the COVID-19 pandemic due to poverty in some of its regions. This is because, in South Africa, inequality is deeply racialised, gendered and spatialised (African Arguments Report, 2020). The COVID-19 pandemic in South Africa is currently menacing previously cushioned sections of society with what poor and working-class individuals and households have always lived through, that is; the struggle to access food, quality education and adequate healthcare (African Arguments Report, 2020). Consequently, the pandemic has exposed and continues to expose both poor and working classes to severe poverty.

### 3.7 MEASURES TO ENHANCE FOOD SECURITY IN SOUTH AFRICA

According to Integrated Food Security South Africa (2002), South Africa faces key food security challenges, namely: ensuring that enough food is available to all now and in the future; matching incomes of people to prices in order to ensure access to sufficient food for every citizen; empowering citizens to make optimal choices for nutritious and safe food; ensuring that there is adequate safety nets and food emergency management systems to provide people that are unable to meet their food needs from their own efforts; mitigating the extreme impact of natural or other disasters on people; possessing adequate and relevant information to ensure analysis, communication, monitoring, evaluation and reporting on the impact of food security programmes on the target population.

To combat the afore-mentioned challenges, the South African government has put several measures in place. For instance, the Cabinet formulated a national food security strategy to integrate the diverse food security programmes, which was in line with Section 27 Constitutional rights, among which it is stated, 'every citizen has the right to access sufficient food and water' – food security. Food security is defined by

FAO (2002) as a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life. Some of the programmes that were introduced to curb food insecurity and reduce the gap between the rich and the poor include, school feeding schemes, child support grants, free health services, pension funds for the elderly and provincial community garden initiatives, e.g. Kgora and Xoshindlala, land reform and farmer settlement, production loans for farmers, grants for farmers and the presidential tractor mechanisation scheme. The vision of the Integrated Food Security Strategy is for all citizens to have access to sufficient, safe and nutritious food that meets their dietary and food preferences for a healthy life. The goal is to eradicate hunger, malnutrition and food insecurity in South Africa. Also, there are other programmes which were formulated due to food security as a result of FAO, i.e. Integrated Food Security Strategy [IFSS] with other departments such as Special Programme Food Security [SPFS], Community Development Programme [CDP] and Integrated Nutrition and Food Safety Programme [INFSP], which also help the previously disadvantaged citizens.

### 3.8 CHAPTER SUMMARY

In summary, literature highlights that food security has played an important role in developing policies, which have now shaped the history of South Africa from the 17<sup>th</sup> century. Food security has formed part of Section 27 of the Constitutional rights of South African citizens. This, therefore, means that every South African has the right to have access to adequate food and water. In addition, the South African government has also played a vital role in endorsing food security. Also noteworthy is that South Africa, along with other emerging economies in the SADC region, is deemed to be food secured at a national level. However, rural households are still food insecure at individual and provincial levels. Furthermore, although there are measures put in place by the South African government (public school feeding schemes, child grants, old-age grants, etc.) to curb poverty and food insecurity in both rural and urban areas. There are still some households that are food insecure in urban and rural areas. Such households are suffering from poverty due to a high unemployment rate and lack of sufficient space in the cities to practice subsistence farming to feed their small families.

## CHAPTER FOUR

### DESCRIPTION OF THE STUDY AREAS, RESEARCH METHODOLOGY AND ANALYTICAL PROCEDURES

#### 4.0 INTRODUCTION

This chapter gives a detailed description of the study areas, research design and research method. These include research techniques, data collection instruments and statistical analytical techniques used in the study. The chapter also presents the specific areas the study focused on, districts municipalities, together with their local municipalities.

#### 4.1 DESCRIPTION OF THE STUDY AREA

The study was conducted in the Limpopo Province of South Africa. The province has five district municipalities, namely: Mopani, Sekhukhune, Vhembe, Waterberg and Capricorn. These five district municipalities are divided into twenty-two local municipalities (Statistics South Africa, 2016). The study was conducted at the two district municipalities of the Limpopo Province, namely, Capricorn and Mopani Districts. The two districts were selected as study areas because their food insecurity is quite notable compared to other districts within the province. Mopani District is located in the north-eastern quadrant of the province. It is approximately 70km from Polokwane, which is the capital city of the Limpopo Province. The district is located between the longitudes of 29° 52'E to 31° 52'E and latitudes of 23° 0'S to 24° 38'S as the central meridian and covering the geographical area of 20 022km<sup>2</sup> (Mopani District Municipality Reviewed Integrated Development Plan, 2018). Mopani District consists of five local municipalities: Ba Phalaborwa, Greater Giyani, Greater Letaba, Greater Tzaneen and Maruleng. Mopani District has a population of 1.093 million and 338 427 households (Statistic South Africa, 2016). The District Municipality's area is shared amongst the five local district municipalities, with Ba-Phalaborwa occupying most of the area with approximately 7 462km<sup>2</sup>, followed by Greater Giyani with an area of 4,172km<sup>2</sup>. Maruleng covering ± 3 244km<sup>2</sup>, Greater Tzaneen covering ±3 243 and lastly, Greater Letaba with approximately 1 891km<sup>2</sup> (Mathebula, 2016). Figure 4.1 below shows a map of the Limpopo Province with the study areas highlighted.

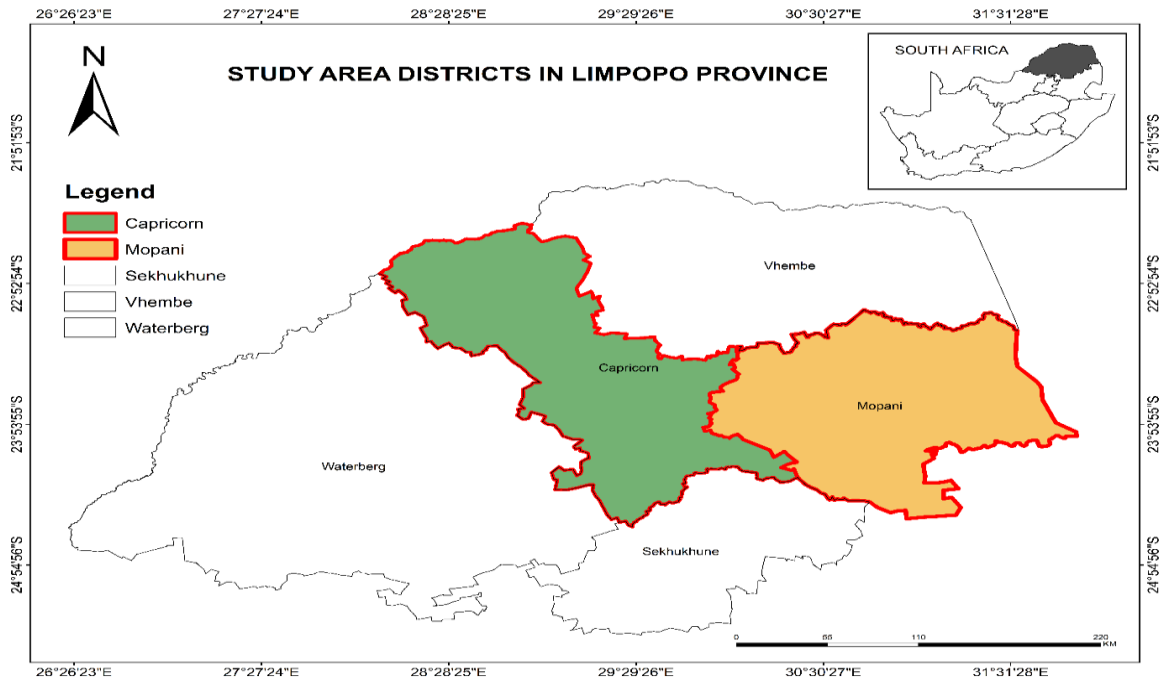


Figure 4. 1: Map of Limpopo Province

Source: ARC-GIS 10.6

The Capricorn District Municipality is situated at the core of economic development in the Limpopo Province. It includes the capital of the province, that is, Polokwane City. This district covers the geographical area of 21.705 km<sup>2</sup> with the population density of 58.1/km<sup>2</sup> (CDM IDP, 2016/2017). The Capricorn District comprised four local municipalities, after the disestablishment of Aganang Local Municipality, namely, Blouberg, Lepelle Nkumpi, Molemole and Polokwane. Capricorn District has a population of 1.261 million and 378 301 households (Statistics South Africa, 2016). A map showing Capricorn District Municipality within the Limpopo Province is indicated in Figure 4.1 above.

The climate of Limpopo Province is characterised by extremely high temperatures, as parts of the province fall within and outside the Tropic of Capricorn. Summer, that is, October to March conditions, typically range from hot, dry to humid, with thunderstorm rain also falling in that season. During the winter season, it is usually dry and cooler, though the clearer skies in this season allow for more sunshine. Humidity tends to be most low as dry conditions prevail. For instance, winter days start off chilly and temperatures rise to warmth by midday, becoming cool and dry in the afternoon before plummeting to coldness at night. However, the eastern regions of Limpopo generally

experience different conditions from the rest of the province. The province is largely at a high altitude as it is predominantly in the high veld. Areas approaching the province's low veld can experience temperatures in the region of 45°C (New Media Holdings, Inc., 2015).

The poverty headcount in this province has increased from 10.1% in 2011 to 11.5% in 2016 (Statistics South Africa, 2016). The increase in poverty was observed in all the district municipalities from 2011 to 2016, except for the Vhembe District, which decreased from 13% in 2011 to 12.8% in 2016 (Statistics South Africa, 2016). The increase in poverty resulted in food insecurity (Crush and Riley, 2018). In addition, poverty is also the cause of hunger, lack of adequate and proper nutrition (FAO, 2009). Given the foregoing background information and the climatic conditions of the Limpopo Province, it is evident that the province has the potential to produce enough food through farming. This is because, in South Africa, the Limpopo Province is noted for higher participation in farming activities when compared to other provinces within the country. This is a result of greater tolerance of various crops and fruits in the climatic conditions of the province. Remarkably, the province is a home to ZZ2, which is one of the largest tomato farms, not only in the local markets, but also in global markets.

## 4.2 DESCRIPTIONS AND MAIN CHARACTERISTICS OF THE LOCAL MUNICIPALITIES UNDER MOPANI DISTRICT

All local municipalities under MDM were considered and rural households from each local municipality were sampled.

### 4.2.1 Greater Tzaneen

The Greater Tzaneen Municipality is situated on the South-Western side of Mopani District Municipality (MDM IDP, 2017). This local municipality is surrounded by Maruleng Municipality on the south, Lepelle-Nkumpi Municipality (South-west), Molemole Municipality (west), Greater Letaba Municipality (North), Greater Giyani Municipality (north-east) and lastly, Ba-Phalaborwa (east). It spans a geographical area of 3240km<sup>2</sup>. The municipality encompasses the proclaimed towns of Tzaneen, Nkowankowa, Lenyenye, Letsitele and Haarnetzburg with 125 rural villages. These areas form the economic growth points in the provincial, district and municipal scales,



respectively. This municipality is further characterised by extensive and intensive farming activities. These include commercial timber, cash crops, tropical and citrus fruit production (MDM IDP, 2017)

#### 4.2.2 Greater Letaba

This municipality is located north-west of Mopani District. It shares boundaries with Greater Tzaneen on the south, Molemole (west), Makhado (north-west) and Greater Giyani (north-east) (MDM IDP, 2017/2018). The total area coverage of Greater Letaba is 1891 km. This municipality was recorded as being the smallest local municipality in the district in terms of the land area it has. Greater Letaba is furthermore characterised by contrasts such as varied topography, vegetation, and population densities. In addition, the south part of the municipal area comprises mountainous terrain, which precludes urban development. However, 5% of the land area is covered by residential development, whilst 30% is taken up by agricultural activities. These include tomatoes, timber, gam and cattle.

#### 4.2.3 Greater Giyani

Greater Giyani is in the north of Mopani District and Giyani is its only town. The municipal area adjoins Thulamela and Makhado in the north-west, Mutale Municipality (north-east), Ba-Phalaborwa (south), Greater Tzaneen (south-west) and lastly, Greater Letaba Municipality (west). This local municipality covers an extent of 4 171.6 km<sup>2</sup> and consists of 93 sparsely located villages. Giyani Town is acknowledged as the largest centre hosting a large concentration of the population, employment opportunities, shopping and recreational facilities in the local municipality. The economic activities that mostly take place in Greater Giyani are both formal and informal. These include small-scale agriculture: maize, vegetables, tomatoes, beef and other services, transport and retail development (MDM IDP, 2017/2018).

There are, however, a number of factors impacting negatively on the economic growth such as distance to the markets, shortage of skills, poor road infrastructure, climate conditions and diseases. However, the municipality has potential for tourism and conservation, which is due to the existing natural heritage sites throughout the area.

There are also mining, latent farming schemes and processing of natural products (Mopani worms and Marula fruit) in the area.

#### 4.2.4 Ba-Phalaborwa

The municipality is situated in the northern part of Greater Giyani and Greater Tzaneen Municipalities, in the south of Maruleng Municipality and in the east of Mozambique. It forms part of the Greater Limpopo Trans-Frontier Park; it consists of 23 villages and 4 towns. Mining is presently the largest sector in this local municipality. However, creating many jobs and providing the highest Gross Value Added (GVA) in the district could also become a constraint in the future. This is due to the short-lived mining production expectancy period which eventually closed. There is a large amount of land in Ba-Phalaborwa that is currently under land claims. Moreover, this land, if restored, can potentially be used for tourism development (MDM IDP, 2018/2019).

#### 4.2.5 Maruleng

The Maruleng Municipality is in the south of Mopani District Municipality. It is abutted by Kruger National Park in the east, the Ba-Phalaborwa and Greater Tzaneen in the north, the Lepell Nkumpi Municipality to the west, and Thaba-chweu, Tubatse and Bushbuckridge Municipalities in the south (MDM IDP, 2017/2018). The municipal area covers 324 699ha and comprises 33 rural villages and 3 urban areas. Most areas around this local municipality experience severe poverty, low human development potential due to high illiteracy rates, low incomes, and a generally low life expectancy, accompanied by low levels of social and basic engineering services. A map showing the local municipalities and their ward areas within the Mopani District is shown in Figure 4.2 below.

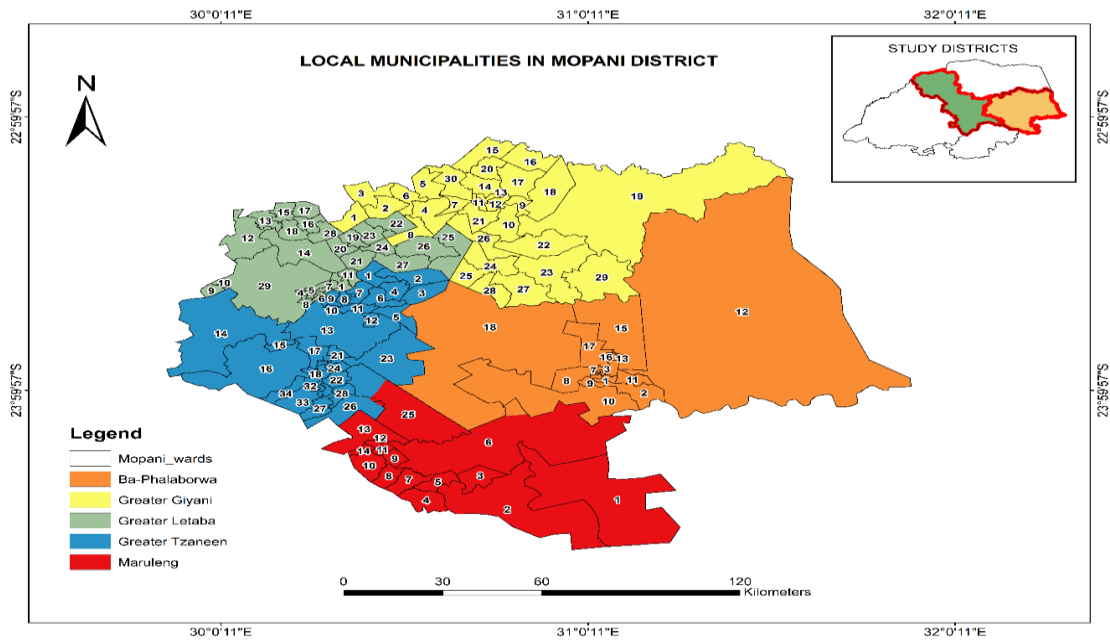


Figure 4. 2: Map showing local municipalities at Mopani District.

Source: ARC-GIS 10.6

#### 4.3 DESCRIPTIONS AND MAIN CHARACTERISTICS OF THE LOCAL MUNICIPALITIES UNDER CAPRICORN DISTRICT MUNICIPALITY

All local municipalities under CDM were considered for the purpose of the study and rural households from each local municipality were sampled.

##### 4.3.1 Blouberg

Blouberg is a municipality that borders Zimbabwe and Botswana. The name Blouberg literally means ‘Blue Mountain’, a mountain range located in the area. This municipal area comprises 21 wards and covers a total area of 9.248 km<sup>2</sup> (CDM IDP, 2016/2017).

##### 4.3.2 Molemole

This local municipality is in the Capricorn District Municipality (CDM) of the Limpopo Province. Molemole accounts for 8.6% of the district’s total population with a population density of 32.4km<sup>2</sup>. The municipality is divided into 14 wards and stretches for about 3.347km<sup>2</sup> (CDM IDP, 2019/2020).

### 4.3.3 Polokwane

Polokwane Municipality is a capital city and major urban centre of the Limpopo Province. It is also referred to as a ‘place of safety’. Polokwane lies 300 km from the Gauteng Province. This municipality has the highest population density of 167 km<sup>2</sup> and the total population of 628 999. Polokwane is 23% urbanised and 71% rural. The municipality consists of 38 wards and covers a total area of 3 766km<sup>2</sup> (CDM IDP, 2016/2017).

### 4.3.4 Lepelle-Nkumpi

It is situated within the Capricorn District Municipality of the Limpopo Province. Lepelle-Nkumpi comprises 18.2% of the district total population with the population density of 66.5km<sup>2</sup> (CDM IDP, 2019/2020). This municipality stretches to about 3.463km<sup>2</sup>. A map showing local municipalities with their wards from Capricorn District is indicated in Figure 4.3 below.

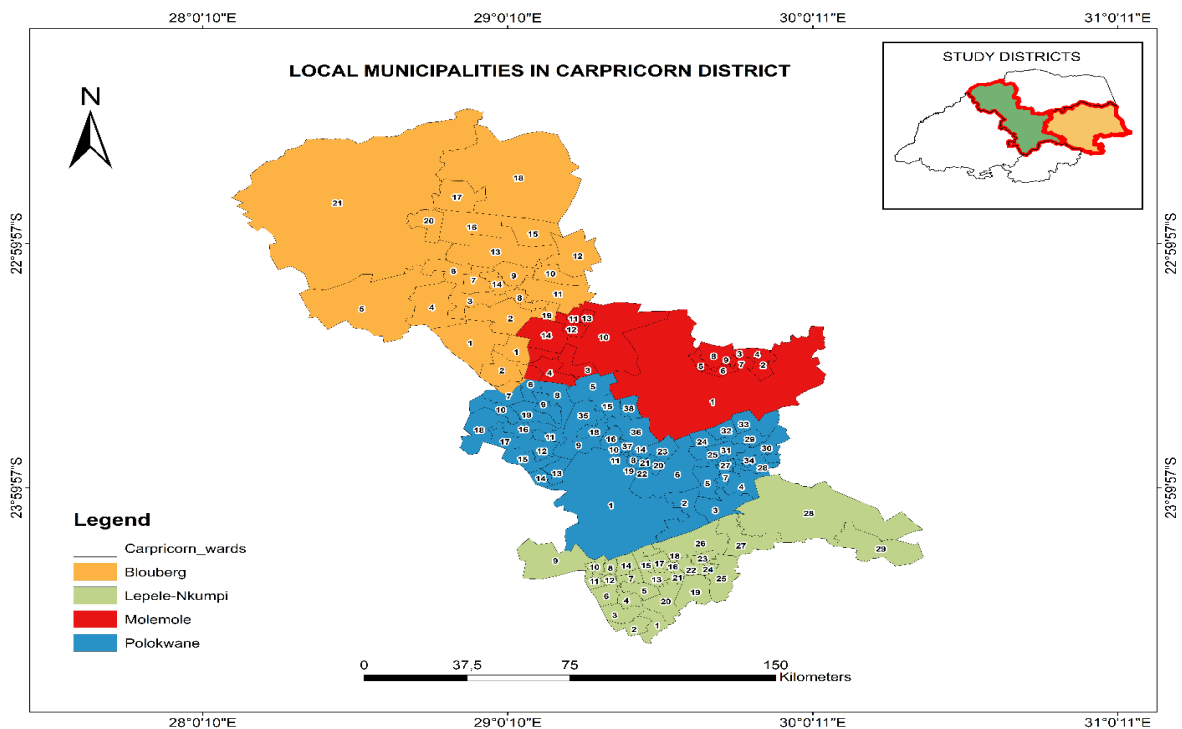


Figure 4. 3: A map showing local municipalities with ward areas from Capricorn District.

Source: ARC-GIS 10.6

#### 4.4 RESEARCH DESIGN

Cross sectional survey is a type of research study, where either the entire population or a subset thereof is selected, and from these individuals, data are collected to help answer research questions of interest (Oslen and George, 2004). For the study, a cross-sectional survey was used to capture detailed information regarding food security among rural households of Mopani and Capricorn districts in Limpopo Province of South Africa, where data was collected from a sample of 346 households

##### 4.4.1 METHODS AND RESEARCH INSTRUMENTS

The main approach that was used was through participatory rural appraisal surveys, observations and interviews focusing on data regarding the following matters:

- a) Demographics and socio-economic characteristic of the households
- b) Food consumption patterns
- c) Food security
- d) Farming system
- e) Technical factors
- f) Institutional factors
- g) coping strategies

A questionnaire was used as an instrument to collect data from rural households of Capricorn and Mopani Districts through a face-to-face interview. The questionnaire used participant codes to label data instead of using names, identification numbers, cell phone numbers, etc., in that way, privacy and confidentiality were ensured. The questionnaire was administered by enumerators to a household head since household head was a unit of analysis.

#### 4.5 SAMPLING FRAME

The unit of analysis of this study was rural household heads residing in Mopani and Capricorn District Municipalities. The study used 173 households in each district municipality, which makes a total of 346 rural households.

#### 4.6 SAMPLING PROCEDURE

Mopani and Capricorn were the two districts municipalities which were considered as suitable areas of study. All local municipalities under each district were considered for the purposes of the study thus making a total of nine local municipalities from both districts. This is because Mopani has five local municipalities while Capricorn consists of four local municipalities, hence a total of nine local municipalities for this study. The study used multi-stage sampling procedures and proportional random sampling as its sampling procedure to select the rural households in the Mopani and Capricorn District Municipalities. The first stage of multi-stage sampling procedure was to divide the Limpopo Province into its five district municipalities. From the five district municipalities, only two district municipalities were selected for the purposes of the study. These two district municipalities were chosen in light of De Cock *et al.* (2013)'s report that Mopani and Capricorn Districts are the municipalities mostly affected by food insecurity shocks within the Limpopo Province. The second stage was the division of these two district municipalities into their local municipalities, thus making up a total of nine local municipalities for this study. A third stage divided the local municipalities into their ward areas to select wards that are classified as rural areas. After this stage, a proportional random sampling was adopted until the household level was reached. The fourth stage was the selection of villages from the nine local municipalities based on the ward areas where households (respondents) were selected based on probability proportionate to size.

Table 4. 1: Number of rural households per each local municipality within Mopani and Capricorn Districts.

District municipality	Local municipality	Number of rural households
Mopani	Greater Tzaneen	89 940
	Greater Letaba	54 940
	Greater Giyani	56 875
	Ba-Phalaborwa	14 883
	Maruleng	21 704
<b>Total</b>		<b>238342</b>
Capricorn	Polokwane	513 734

	Molemole	108 798
	Blouberg	159 592
	Lepele-Nkumpi	204 928
Total		<b>987 052</b>

Source: (Statistics South Africa, 2011)

Table 4.1 above shows the number of rural households in each local municipality under the Mopani and Capricorn Districts. Mopani District has five local municipalities and a total number of 238342 rural households whereas the Capricorn District consists of four local municipalities with a total number of 987 052 rural households.

#### 4.7 Sample size

The sample size was determined using the following formula:

$$n = \frac{z^2 \cdot p \cdot q \cdot N}{e^2 \cdot (N-1) + z^2 \cdot p \cdot q} \dots\dots\dots 1$$

According to Kothari (2004), Where; n=desired sample size, z= value of standard deviation at 95% confidence level (in this case 1.96), e=desired level of precision (±5%), p=sample proportion in target population, q=1-p and N=size of population. The formula gave the total sample size of 346 households for the study, which consists of 173 households in each district municipalities (Mopani and Capricorn). From these two district municipalities, the proportional random sampling was employed to select households to participate in the study under each local municipality. Table 4.2 below shows the distribution of the sample size with respect to each local municipality.

Table 4. 2: The distribution of the sample size with respect to each local municipality.

Study Areas: Capricorn DM	Blouberg	Lepelle Nkumpi	Molemole	Polokwane		Total
Sample size/LM	28	36	19	90		173
Percentage	16	21	11	52		100
Mopani DM	Ba Phalaborwa	Giyani	Letaba	Tzaneen	Maruleng	

Sample size	11	41	40	65	16	173
Percentage	6	24	23	38	9	100
<b>Total</b>						<b>346</b>

Source: Author's compilation (2020)

#### 4.8 ENUMERATOR SELECTION AND TRAINING

Five enumerators were selected according to their experience in agriculture, field work and data collection. The team was chosen from the Limpopo province, where the study was conducted. All the enumerators were fluent in Sepedi and Xitsonga, which are the local languages spoken in the study areas. Training was attended for a week, to familiarise every enumerator with different sections of the questionnaire.

#### 4.9 JUSTIFICATION FOR THE SELECTION OF THE STUDY AREA

The Limpopo Province has a population of about 5 million and is divided into five district municipalities (Statistic South Africa, 2011). According to Statistics South Africa (2019), the Limpopo Province falls under provinces that are predominantly rural with the highest level of poverty, followed by the Eastern Cape and KwaZulu-Natal Province. Chakona and Shackleton (2019) argued that, with high levels of poverty, it is challenging for most South African households to purchase sufficient food to feed their entire family. In addition, De Cock *et al.* (2013) highlighted that rural households in the Limpopo Province were severely food insecure. Food insecurity is evident in the Capricorn and Mopani District Municipalities. This is further supported by the fact that, the prevalence of food insecurity in Limpopo Province is noted to be higher than the national rate and the participants/households are at high risk and are also experiencing hunger as compared to the national rate of 28% and 26%, respectively in 2012 (Mbhatsani *et al.*, 2021). Therefore, a better representation of food security with a larger sample size could be better estimated from this area.

#### 4.10 FOOD SECURITY CONCEPTUAL FRAMEWORK

To resolve the research problem and hypothesis stated in the preceding chapter, a conceptual framework, consolidating the four pillars of food security, was developed. Figure 4.4 below presents the conceptual framework of the study:



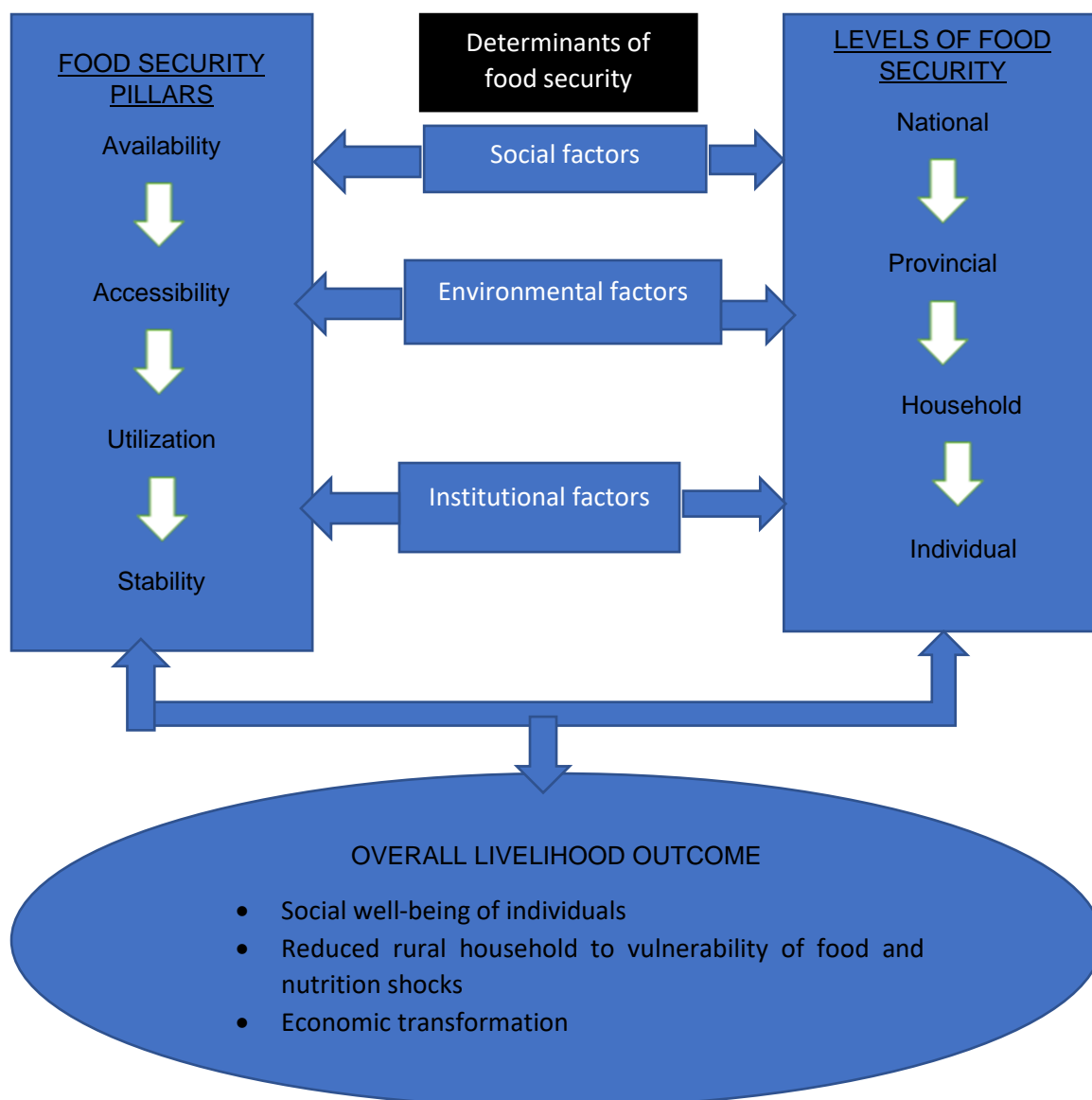


Figure 4. 4 *Conceptual framework*

**Source:** Own Compilation

Figure 4.4 above shows the four pillars of food security, namely, availability, accessibility, utilisation, and stability. The four dimensions are interrelated and interdependent, rather than static and separate. For an economy, province, and individual household to be considered food secure, all the dimensions should be fulfilled. The weighting of the four dimensions is another problem faced by the visualisation of four pillars, which directs to an impression of average weighting of 25% (a quarter each) for each of the four dimensions (Peng and Berry, 2019). According to Berry *et al.* (2015), the weightings for the four pillars of food security are context-based

and specific to each economy. In addition, food production within an economy as well as from imports determine food quality, quantity as well as the health of the citizens. During the short-term, that is, when an economy identifies its vulnerability to food security, there is a need to implement strategies to reduce poverty. For instance, by providing social grants whilst in the medium term, the economy becomes food secure and for a long-term period, strategies should be implemented so that the future generation becomes sustainably food secured.

#### 4.11 PILLARS OF FOOD SECURITY

##### 4.11.1 Availability

Food availability is an essential factor to be considered in ensuring a sustainable food security system. Barrett (2010) posited that, even though aggregate food availability is insufficient to ensure either access to proper utilisation of nutrients to achieve food security, aggregate availability is, however, a necessary condition for food security. Food insecurity is inevitable within an economy lacking enough food to satisfy all its population's nutritional needs. Lutz *et al.* (2002) highlighted that, increase in population, poverty, education, and gender inequalities are critical factors that reduce food production, thus leading to a decline in food availability and invariably resulting in food insecurity.

##### 4.11.2 Accessibility

If food security is to be a measure of household or individual welfare, it must address access. FAO defined food security as a situation when all people, always have physical and economic access to sufficient, safe, and nutritious food to meet their dietary needs and food preferences for a healthy and active life (Pinstrup-Andersen, 2009). Godfray *et al.* (2010) examined the role of price in determining access to food. The authors posited that, the global price patterns of food are indicators of trends in the availability of food.

##### 4.11.3 Utilisation

According to Barrett (2010), food utilisation reflects concerns about whether individuals and households make good use of the food to which they have access. In this study, it was held that the nutritional value of food in terms of essential micronutrient and vitamins and the ability of the body to metabolise and absorb these nutrients is an essential factor of food security.

#### 4.11.4 Stability

Aborisade and Bach, (2014) identify world market stability as a factor to a sustainable food security. World market stability is said to be largely dependent on the actions of major grain trading countries, improvement in the sensitivity of domestic storage and consumption to world conditions could increase their contribution to world food security.

#### 4.12 DESCRIPTIVE ANALYSIS

Descriptive analysis from Statistical Package for the Social Sciences (SPSS) 27 was used to analyse the first, second and the last objective. The first objective was to profile the socio-economic characteristics of rural households in Capricorn and Mopani Districts. The second objective was to assess food consumption patterns. The last objective was to identify strategies to enhance food security. Descriptive analysis used frequencies, percentages, and the averages. The results were presented in forms of tables and graphs to describe the consumption patterns of rural households and to identify the strategies employed to enhance food security.

#### 4.13 FOOD SECURITY INDEXES

For objective three, which was to determine food security status, the four dimensions of food security were analysed separately. Each dimension was analysed as follows:

**Availability:** the questionnaire was used to address this dimension of food security, where rural households were asked questions related to food availability. Food availability was also covered in the use of HFIAS. After accumulating responses from the participants, descriptive statistics was used to interpret food availability.

#### 4.13.1 Household Food Insecurity Access Scale (HFIAS)

Access: Household Food Insecurity Access Scale was used to measure food access among rural households in Capricorn and Mopani Districts. The HFIAS is designed to assess the component of household food insecurity (Masekoameng and Maliwichi, 2014). The HFIAS asks the respondents nine food accessing questions. This method assesses whether the households have experienced problems with food access.

HFIAS is the adaption of the approach that is used to estimate the prevalence of household food insecurity (access) (Coates *et al.*, 2006). It also helps to distinguish a food secure household from a food insecure household. This method is based on the idea that the experience of food insecurity (access) causes predictable reactions and responses that can be captured and quantified through a survey and summarised in a scale (Food and Nutrition Technical Assistance [FANTA], 2004). The HFIAS consists of a question called an occurrence question. There are nine occurrence questions asked to determine whether a specific condition associated with the experience of food insecurity ever occurred during the previous four weeks (30 days). The household is expected to answer a question intending to discover how often or how many times the event happened in the preceding four weeks (by stating yes or no). If the respondent answers “yes” to an occurrence question, a frequency of occurrence question is asked to determine whether the condition happened rarely (once or twice), sometimes (three to ten times) or often (more than ten times) in the previous four weeks. Each severity question is followed by a frequency-of-occurrence question, which asks how often a reported condition occurred during the previous four weeks. The HFIAS score variable is calculated for each household by summing up the codes for each frequency-of-occurrence question. The maximum score for a household is 27. The higher the score, the more food insecurity (access) a household experienced. The lower the score, the less food insecurity (access) a household experienced (Coates *et al.*, 2006).

Table 4. 3: Household Food Insecurity Access Scale generic questions

NO	QUESTIONS	RESPONSE OPTIONS
		<p><b>1= Rarely</b> (once or twice in the past 30 days) <b>2= Sometimes</b> (three to ten times in the past 30 days) <b>3= Often</b> (more than 10 times in the past 30 days).</p>
1	In the past four weeks, did you worry that your household would not have enough food?	
2	In the past four weeks, were you or any household member not able to eat the kinds of foods you preferred because of the lack of resources?	
3	In the past four weeks, did you or any household member have to eat a limited variety of foods due to the lack of resources?	
4	In the past four weeks, did you or any household member have to eat some foods that you really did not want to eat because of the lack of resources to obtain other types of food?	
5	In the past four weeks, did you or any household member have to eat a smaller meal than you felt you needed because there was not enough food?	

6	In the past four weeks, did you or any household member have to eat fewer meals in a day because there was not enough food?	
7	In the past four weeks, was there ever no food to eat of any kind in your household because of the lack resources to get food?	
8	In the past four weeks, did you or any household member go to sleep at night hungry because there was not enough food?	
9	In the past four weeks, did you or any household member go for a whole day and night without eating anything because there was not enough food?	

For each of the above questions, a respondent had to consider what had happened in the past 30 days. The respondent also had to indicate the frequency at which this happened by stating never, rarely (once or twice), sometimes (3-10 times), or often (more than 10 times) in the past 30 days.

The HFIAS Score is between 0-27 and the sum of the frequency of experience during the past 30 days for the 9-food insecurity-related conditions: Sum frequency code (Q1 + Q2 + Q3 + Q4 + Q5 + Q6 + Q7 + Q8 + Q9) (FANTA, 2004).

When the household does not experience any food insecurity or rarely worries about food, it is categorised as food secure. A moderate food insecure household worries about not having enough food sometimes or often or is unable to eat preferred foods and/or eats the same diet rather than what is desired, or some foods considered undesirable, but only rarely. However, HFIAS does neither leaves out the quantity nor experience of any of three most severe conditions, such as running out of food, going to bed hungry and/or going for a whole day and night without eating. When the quantity is more important than the quality of food, eating the same diet or undesirable foods sometimes or often, or even reducing the size of meals or number of meals, and the aforementioned happen either rarely or sometimes, the household is categorised as

moderately food insecure. A severely food insecure household has cut back on the meal size or the number of meals or runs out of food, goes to bed hungry and/or goes for a whole day and night without eating. This means that, households that have experienced these three conditions, even if it was once in the last 30 days, are categorised as severely food insecure. After using HFIAS to determine the food security status, three outcomes were accumulated: less food insecure, moderately food insecure and severely food insecure, respectively.

#### 4.13.2 Household Dietary Diversity Score (HDDS)

Utilisation: the household dietary diversity score was used to measure utilisation, as this dimension refers to the dietary intake to absorb nutrients contained in various food groups. The Household Dietary Diversity Score was used because it reflects the number of different food groups consumed over a given reference period (De Cock *et al.*, 2013). The reason for the choice of HDDS is that a more diversified diet represents an important outcome as it is highly correlated with factors such as household income (even in very poor household, an increase in household expenditure from additional income is associated with increased quantity and quality of the diet). The questions asked in relation to HDDS are very straightforward, and it takes less than a few minutes for a respondent to answer. HDDS makes it possible to examine the food security status by looking at how diverse the household's diet is at the household level. It is also used to investigate the socio-economic level in a household and reflects a better quality of nutrients by listing a set of 12 food groups. However, HDDS does not consider foods consumed outside the household (De Cock *et al.*, 2013). Households were asked based on the food groups they had consumed over the past seven days (Bandoh and Kenu 2017).

HDDS represents a number of different foods or food groups consumed over a given reference period and is calculated by adding the number of food and food groups consumed. The questionnaire is based on a set of food group questions and can be used to determine the household's dietary score by categorising different types of food based on the nutrients they comprise.

Table 4. 4: The categories of food groups

Food groups	points
1. Any bread, rice, or any other foods made from millet, sorghum, maize, wheat or any other locally available grain	1
2. Any potatoes, yams, cassava or any other foods made from roots or tubers	1
3. Any vegetables	1
4. Any fruits	1
5. Any beef, pork, lamb, rabbit, chicken, duck, other birds and organ meats	1
6. Any eggs	1
7. Any fresh or dried fish or shellfish	1
8. Any food made from beans, peas and lentils	1
9. Any yoghurt, milk, or milk products	1
10. Any food made with oil, fat or butter	1
11. Any sugar	1
12. Any food such as coffee or tea	1
Total	12

**Key:** if the answer is yes, award 1 point, and if the answer is no, award 0 points

A single point was awarded to each of the food groups consumed over the reference period, giving a maximum sum total dietary diversity score of 12 points for each individual in the event that his/her responses were positive to all food groups (Taruvinga, Muchenje and Mushunje, 2013). A value of zero, therefore, meant a low dietary diversity score (HDDS) and the closer the score was to 12, the higher the



dietary diversity of the respondent. This approach avoids a crude categorisation of dietary diversity into low, medium and high by treating dietary diversity as a continuum (Agwu *et al.*, 2012).

#### 4.14 MULTIPLE LINEAR REGRESSION MODEL (MRM)

HFIAS was used as a measurement instrument for food accessibility. Thereafter, descriptive statistics was used to identify the food security status of rural households in the Mopani District Municipality [MDM] and Capricorn District Municipality [CDM]. Furthermore, the Multiple Linear Regression Model [MRM] was used to understand the determinants that led to less, moderate, and severe food insecure households in both districts' municipalities. According to Anghelache *et al.* (2014), MRM is a tool that offers the possibility to analyse the correlations between more than two variables. The advantage of this model is that it may lead to a more accurate and precise understanding of the association of each individual factor with the outcome. In addition, the model also yields an understanding of the association of all the factors with the outcome and associations between the various predictor variables (Marill, 2004). This model was chosen because it allowed the researcher to predict an outcome based on one or several predictors. However, Household Food Insecurity Access Scale was used as the dependent variable, and it was treated as a continuous variable, hence, the Multiple Linear Regression was used. By regressing independent variables against HFIAS, the determinants of food security were estimated. HFIAS was used as a dependent variable with the implicit form of regression expressed as illustrated in equation 2 (Shyti and Valera, 2018):

$$Y = f (X_1, X_2, \dots, X_n) + e \dots \dots \dots 2$$

Where:

Y = HFIAS (Household Food Insecurity Access Scale score)

X<sub>1</sub>, X<sub>2</sub>, .....X<sub>n</sub> (Independent variables)

e = Error term

#### 4.15 MULTINOMIAL LOGISTIC REGRESSION MODEL (MLRM)

The Multinomial Logistic Regression Model (MLRM) was used to examine the determinants of food security, which was the fourth objective of the study. The Multinomial Logistic Regression Model was employed to estimate the determinants of food security among rural households in the Capricorn and Mopani Districts. The model was used to handle the case of dependent variables with more than two classes. According to Bayaga (2010), the advantage of the Multinomial Logistic Regression Model is its computational ease, and that, it is relatively robust, as measured by goodness of fit or prediction accuracy. The model was chosen because it enabled the analysis of data, where the respondents were faced with more than two choices. In this study, the outcome of the household food security status was categorised into three: 0= less food insecure; 1= moderately food insecure and 2= severely food insecure. For data analysis purposes, food secure (category 0) was used as a base term and was compared with moderately food insecure and severely food insecure when presenting the results. Following an approach by Gujarati (2002), the typical logistic regression model was formulated as follows:

$$\text{Logit} (P_i) = \ln (P_i / 1 - P_i) = \alpha + \beta_1 X_1 + \dots + \beta_n X_n + U_t \dots \dots \dots (3)$$

Where;

$\ln (P_i / 1 - P_i)$  = logit for household food security status categories

$P_i$ = food secure

1-  $P_i$ = moderately or severely food insecure

$\beta$  =coefficient

X=covariates

$U_t$ =error term

The probability that a household is classified in one of the household food security status categories compared to the other is restricted to lie between zero and one ( $0 \leq P_i \leq 1$ ).  $P_i$  represents the probability of a household to be less food insecure and  $(1 - P_i)$  represents the probability of a household to be either moderately or severely food

insecure. The model was, therefore, used to assess the odds of moderately food insecure versus less food insecure and severe food insecure vs less food insecure. By fitting the variables into the model, the model was presented as follows:

$$\ln \left( \frac{P_i}{1 - P_i} \right) = \beta_0 + \beta_1 \text{ Age} + \beta_2 \text{ Gender} + \beta_3 \text{ Household income} + \beta_4 \text{ Household size} + \beta_5 \text{ Level of education} + \beta_6 \text{ Marital status} + \beta_7 \text{ Employment status} + \beta_8 \text{ Remittances} + \beta_9 \text{ Access to credit for borrowing money}$$

#### 4.16 DESCRIPTION OF VARIABLES SPECIFIED IN THE MULTIPLE LINEAR REGRESSION AND MULTINOMIAL LOGISTIC REGRESSION MODELS

This section focuses on a description of the variables specified in the Multiple Linear Regression and Multinomial Logistic Regression Models. Using conclusions inferred from other studies, *a priori* influence of various households' characteristics was estimated.

Table 4. 5: Variables specified in the Multiple Linear Regression Model and their expected signs.

Variables	Description	Units of measurements	Expected sign
<b>Food security [HFIAS] (Dependent variable)</b>	<b>HFIAS</b>	Continuous	
<b>Independent Variables</b>			
Age of household head (X <sub>1</sub> )	Actual years of household	Actual number of years	-
Gender of household head (X <sub>2</sub> )	Male=0; Female=1	Dummy	+
Household income (X <sub>3</sub> )	R1000=0; R1099- R1999=1; R2000- R2999=2; R3000- R3999=3; R4000- R4999=4 and over R5000	Categorical	+
Household size (X <sub>4</sub> )	Household size	Actual number	-

Level of education (X <sub>5</sub> )	0= never went to school; 1= primary school; 2= secondary school; 3=tertiary school;4=Abet	Categorical	+
Employment status (X <sub>7</sub> )	Unemployed=0; employed=1	Dummy	+
Remittances(X <sub>8</sub> )	No=0; Yes=1	Dummy	+
Access to credit for borrowing money (X <sub>9</sub> )	No=0; Yes=1	Dummy	-

Table 4.6: Variables specified in Multinomial Logistic Regression Model and their expected signs.

Variables	Description	Units of measurements	Expected sign
<b>0=foodsecure;1=moderately food insecure,2=severely food insecure. (Dependent Variable)</b>	<b>Food security category</b>	Categorical	
<b>Independent Variables</b>			
Age of household head (X <sub>1</sub> )	Actual years of household	Actual number of years	-
Gender of household head (X <sub>2</sub> )	Male=0; Female=1	Dummy	+
Household income (X <sub>3</sub> )	R1000=0; R1099-R1999=1; R2000-R2999=2; R3000-R3999=3; R4000-R4999=4 and over R5000	Categorical	+
Household size (X <sub>4</sub> )	Household size	Actual number	-
Level of education (X <sub>5</sub> )	0= never went to school; 1= primary school; 2= secondary school; 3=tertiary school;4=Abet	Categorical	+
Employment status (X <sub>7</sub> )	Unemployed=0; employed=1	Dummy	+
Remittances(X <sub>8</sub> )	No=0; Yes=1	Dummy	+

Access to credit for borrowing money (X <sub>9</sub> )	No=0; Yes=1	Dummy	-
--	-------------	-------	---

#### 4.16.1 Socio-economic factors

The following section elucidates the socio-economic factors that affect food security by giving details on how each variable is measured and the anticipated direction of influence for each variable.

##### 4.16.1.1 Age

Age was measured by the actual number of years of the household head. According to Zhou *et al.* (2019), age influences the food security status of households. The study conducted by Beyene and Muche (2010) highlighted that, as the age of the household increases, it is assumed that household farmers could acquire more knowledge and experience, and that their chance to become more food secure increases with age. On the contrary, Bashir *et al.* (2012) found that an increase of one year in the age of household head decreases the chance of the household to become food secure. To this end, a negative correlation is expected.

##### 4.16.1.2 Gender

The gender of the household head has to do with the role that is played by the individual in providing households needs, including acquisition of food (Abu and Soom, 2016). Abu and Soom (2016) also noted that female-headed households are usually older and have fewer years of education than male-headed households. However, Elias *et al.* (2013) highlighted that, if both men and women have more equal participation in agriculture, production can be enhanced together with food security. Beyene and Muche (2010) noted the gender of household head as an important determinant of food security. This variable was taken as a dummy variable (0=male; 1=female). Therefore, the expected effect of this variable was positive.

##### 4.16.1.3 Household income

Household income was measured by the amount of income each participant received per month. Household income is important since it determines how much can be utilised on various needs of the household. The quantity and quality of a household's

expenditure patterns are highly correlated with the household purchasing power (Sekhampu, 2013). Additionally, the more a household head participates in gainful employment, the higher the income to be earned and the greater the chances of being food secure (Abu and Soom, 2016). Therefore, a positive correlation was expected from this variable.

#### 4.16.1.4 Household size

Bashir *et al.* (2013) defined household size as the number of total individual members in the household. Household size was measured by the number of family members in the household. Literature argues that household size determines the food security status of households (Abu and Soom, 2016). It was, therefore, expected that as the household size increased, there was a probability of food insecurity. Consequently, a larger household size was perceived as requiring increased food expenditure and as competing for limited resources (Sekhampu, 2013). Thus, a negative correlation was expected.

#### 4.16.1.5 Level of education

The level of education was measured as a categorical variable. The variable was coded as follows: 0= never went to school; 1= primary school; 2= high school; 3=tertiary school. Education is an important variable determining household food security (Beyene and Muche, 2010). Urassa (2010) argues that households with more education or other forms of human capital stand a better chance of engaging in non-farm income or credit. Agidew and Singh (2018) noted that a farming household with more education has the chances of obtaining higher yields and become food secure. Similarly, Koffio-Tessio *et al.* (2005) also highlighted that in rural areas, education improves agricultural productivity, which leads to food security. Moreover, as the level of education increases, the percentage of food secure households also increases (Abu and Soom, 2016). A positive correlation between the level of education and food security was expected. The assumed positive relationship was based on the given literature about the level of education in a given household.

#### 4.16.1.6 Employment status

Employment status was taken as a dummy variable. The variable was coded as follows: 0=unemployed; 1=employed. Literature argues that a household with an employed individual increases its ability to consistently acquire food (Mark *et al.*, 2014). At this end, a positive correlation was expected.

#### 4.16.1.7 Remittances

Remittances was treated as a dummy variable. The households were asked whether they received remittances or not (0=no; 1=yes). The results highlighted that remittance had always been one of the important sources of income and external finances for many poor people across developing countries and a promising source of economic growth (Jebran *et al.*, 2016). With this information, a positive correlation was expected.

#### 4.16.2 Institutional factors

##### 4.16.2.1 Access to credit for borrowing money

Access to credit for borrowing money was taken as a dummy variable, where rural household heads were asked if they had access to credit or not. The value of 0 was coded as 'no', if the household did not have access to credit and the value of 1 was coded as 'yes', if the household had access to credit (0=no; 1=yes). According to Abdul-Jalil (2015), poor rural households in developing countries lack adequate access to credit. In addition, many professionals believe that the lack of credit has negative consequences for poor people's agricultural productivity, food security, health, and overall household welfare (Abdul-Jalil, 2015). Considering this submission, a negative correlation was expected.

## CHAPTER FIVE

### MOPANI DISTRICT MUNICIPALITY DESCRIPTIVE STATISTICS, EMPIRICAL FINDINGS AND DISCUSSION

#### 5.0 INTRODUCTION

This chapter presents the research findings from the Mopani District Municipality (MDM) in terms of descriptive results and empirical results. The chapter first presented the descriptive statistics on socio-economic characteristics of households. The chapter further discussed the empirical results from the study area and lastly, gave a summary of the discussed results.

Table 5. 1 Basic statistics of all the respondents.

VARIABLES		FREQUENCIES	PERCENTAGES %
Gender	Male	66	38.2
	Female	107	61.8
Level of education	Never went to school	6	3.5
	Primary school	17	9.8
	Secondary school	72	41.6
	Tertiary school	75	43.4
	Abet school	3	1.7
Employment status	Employed	65	37.6
	Unemployed	108	62.4
Household income	Over R1000	17	9.8
	R1099-R1999	45	26.0
	R2000-R2999	52	30.1
	R3000-R3999	20	11.6
	R4000-R4999	17	9.8
	Over R5000	22	12.7
Source of income	Wages	5	2.9
	Salary	62	35.8
	Old Age pension	31	17.9
	Child grant	46	26.6



	Other grants from government	29	16.8
Remittance	No	107	61.8
	Yes	66	38.2
Access to credit for borrowing money	No	112	64.7
	Yes	61	35.3
Access to arable land	No	27	15.6
	Yes	146	84.4
Road condition	Poor	113	65.3
	Good	60	34.7
Assistance from extension officers	No	173	100
Do you participate in	None	51	29.5
	Formal markets	0	0
	Informal markets	74	42.8
	Use the produce for home consumption	48	27.7
	<b>MINIMUM</b>	<b>MAXIMUM</b>	<b>AVERAGE</b>
Age	29	89	59
Household size	1	16	9

Source: Research survey

Table 5.1 above presents the socio-economic characteristics of the study sample. A total of 173 respondents were considered. Female respondents (61.8%) were more compared to their male counterparts (38.2%). The results of the study show that some respondents depended more on salary (35.8%) whereas those who depended on child support grant were (26.6%). The largest income group of the respondents comprised those whose income ranged from R2000 to R2999 per month. Table 5.1 further reveals that, a significantly large number of respondents (43.4%) possessed tertiary education. None of the respondents received assistance from extension officers. About 51% of the respondents did not participate in both informal and formal markets. 42.8% of the respondents participated in informal markets. Majority of the respondents (84.4%) had access to arable land. 65.3% of the respondents rated the road condition of their villages as poor. Household size was observed to range between a minimum of one and a maximum of 16 family members, with an average household size of nine

members. The youngest and oldest respondents were 29 and 89 years old, respectively, with the sample's average age being 59 years.

The next section presents the rural households' food consumption pattern.

Table 5.2 presents the consumption pattern of food items/groups consumed by the rural households in the Mopani District Municipality [MDM].

Table 5. 2: Food consumption patterns

Food groups or types	Consumption status (%)		Consumption frequency (%)	
	Yes	No	Daily	Weekly
1. Any bread, rice, or any other foods made from millet, sorghum, maize, wheat or any other locally available grain	98.3	1.7	33.2	39
2. Any potatoes, yams, cassava or any other foods made from roots or tubers	59.0	41	14.5	31.2
3. Any vegetables	89.6	10.4	32.9	49.7
4. Any fruits	89.0	11	60.7	22.5
5. Any beef, pork, lamb, rabbit, chicken, duck, other birds and organ meats	93.1	6.9	31.8	34.7
6. Any eggs	93.6	6.4	64.2	24.3
7. Any fresh or dried fish or shellfish	37.8	62.2	5.2	17.3
8. Any food made from beans, peas and lentils	56.7	43.3	11.6	26.0

9. Any yoghurt, milk, or milk products	80.9	19.1	30.6	25.4
10. Any food made with oil, fat or butter	91,9	8.1	67,6	13.9
11. Any sugar	98.3	1.7	92.5	3.5
<b>Average</b>	<b>80.75</b>	<b>19.25</b>	<b>52.40</b>	<b>47.60</b>

Source: Research survey

Table 5.2 shows that the majority of the respondents (80.75%) consumed all the food groups shown in the table above. These findings, therefore, suggest that rural households of MDM had a diverse diet and that they consumed different nutritious foods, as reflected on the table. The results also depict the average consumption of food groups. The consumption frequency of the food groups also revealed that, on average, the food groups were mostly consumed on daily and weekly basis (52.40%; 47.60%, respectively) Furthermore, the findings of the study indicated that bread, rice, wheat and maize constituted the highest percentage of food groups that were consumed in the study area. This was due to that fact that maize products are the staple food in the Limpopo Province.

## 5.1 ANALYSIS OF THE FOUR DIMENSIONS OF FOOD SECURITY

This section presents the food security status of the rural households of MDM using the four dimensions of food security. The section further presents the factors influencing the food security of rural households of MDM.

### 5.1.1. Availability of food

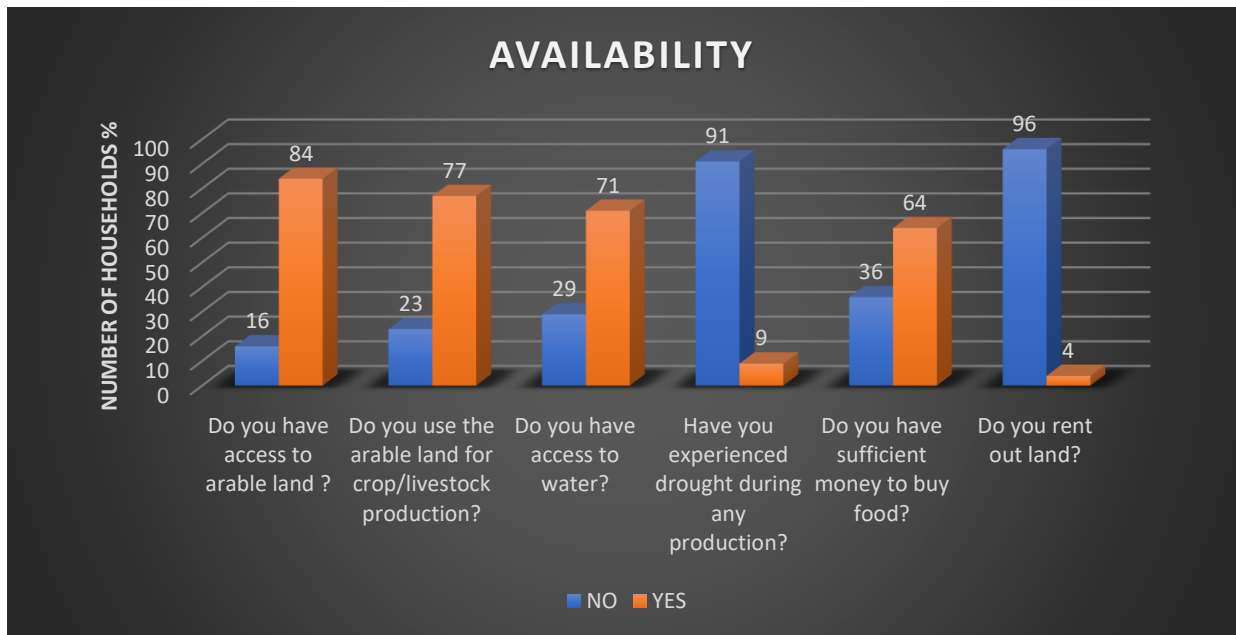


Figure 5. 1: *Food availability in Mopani District*

Source: *Research survey*

Rural households of the Mopani District Municipality were asked questions related to the availability of food, as shown by figure 5.1. According to the figure above, a majority of rural households had access to arable land, which they used for crop/livestock production. About 71% of the households had access to water for production. The results confirmed that rural households had never experienced drought during any production. Furthermore, figure 5.1 shows that 64% of the rural households had sufficient money to buy food and did not rent out land; instead, they used it for their own production. These results simply showed that rural households of Mopani District Municipality had important resources to ensure food availability, thus making the rural households less food insecure.

### 5.1.2 Accessibility of food

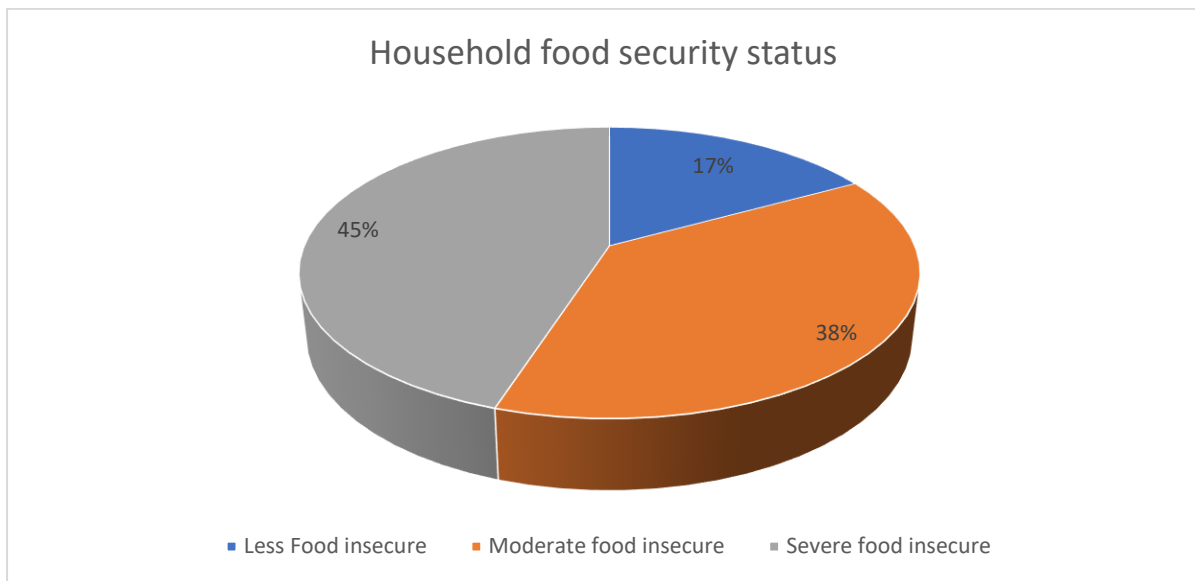


Figure 5. 2: Household food security status of the study area.

Source: Research survey

Figure 5.2 provides an overview of the food security status of rural households in the Mopani District Municipality using HFIAS. The descriptive results revealed that, the majority (45%) of rural households from the study area were severely food insecure. These results suggested that these households were experiencing severe food insecurity shocks. The results also revealed that, a few (38%) households at the Mopani District Municipality were categorised as moderately food insecure. These results suggested that, a few households at the study area experienced moderate food insecurity shocks. Approximately 17% of the rural households in the study area were less food insecure. Given the results on the food security status of rural households in the Mopani District Municipality, one can assert that the district is characterised by households that range from moderate to severe food insecurity. The high unemployment rate at MDM results in the majority of these rural households had access to land but were inactive in terms of agricultural activities, which caused more households to be food insecure. Factors influencing food security status are discussed below.

### 5.2 DETERMINANTS OF HOUSEHOLD FOOD SECURITY STATUS AMONG RURAL HOUSEHOLDS OF MDM

The results of the Multiple Linear Regression Model are presented in Table 5.3 below with reference to the overall fit of the model, the F value of the model 5.431, R<sup>2</sup> and adjusted R<sup>2</sup> at 1% and 5% significance level.

Table 5. 3: Determinants of household food security status

Variables	B	SE	Significance
	Dependent variable: HFIAS		
Constant	3.378	3.155	0.286
Gender	0.894	0.903	0.324
Age of household head	0.86	0.040	0.034**
Household size	-0.112	0.146	0.445
Level of education	-0.433	0.264	0.103
Employment status	-0.284	1.197	0.813
Household income	-0.529	0.373	0.159
Source of income	0.592	0.494	0.232
Remittances	2.326	0.941	0.014**
Access to credit	2.941	0.895	0.001***
F-value	5.431		
R squared	.708		
Adjusted R squared	.683		
Number of observations	173		

**Note: \*\*\* and \*\* indicate significance level at 1% and 5% respectively**

Source: Research survey

From the ten predictor variables fitted in the Multiple Linear Regression Model, three variables (Age of household head, remittances, and access to credit) had a significant impact on households' food security. All these significant variables had positive signs, implying that an increase in these variables was associated with household food insecurity.

### 5.2.1 Age of a household head

The age of household head had a positive correlation with HFIAS, with a 5% level of significance. This implied that, as the age of a household head increased, there was a greater chance of food insecure households. This could be because, the older the household head gets, the more they retire and start receiving old age grants or pension money, which may not be sufficient to acquire food. Similar findings were shared by Zhou *et al.* (2019) who opined that age is an important factor in determining food insecurity. Several authors also shared the same sentiment indicating that food insecurity at a household level was related to several factors. For instance, age of a household head was one of them. These results are conclusive because the study observations and previous studies agreed that age of a household head was the socio-economic factor of food insecurity.

### 5.2.2 Remittances

The results of the study revealed a positive association between remittances and HFIAS with a significance level of 5%. These results suggested that the more households get remittances, the more likely they are to reduce their food insecurity. This could be because remittances have always been one of the important sources of income and external finances for many poor people across developing countries. Remittances have always been a promising source of economic growth because they determine how much can be spent on various needs of households (Jebran *et al.*, 2016). The results are conclusive as Jebran *et al.* (2016) concurred with the findings of the study that remittances have an influence on food security.

### 5.2.3 Access to credit for borrowing money

Access to credit for borrowing money was positively associated with HFIAS at 1% significance level. This meant that households that had access to credit for borrowing money were more likely to be food secured. The findings implied that rural households with access to credit could be able to purchase food variates for a balanced diet. In addition, a balanced diet explicates food security for a household. Several authors corroborated with this study results (Aidoo *et al.*, 2013; Mustapha *et al.*, 2016; Kehinde and Kehinde, 2020). The study therefore finds the results conclusive as access to credit was found to positively influence food security status.

### 5.3 Utilisation of food

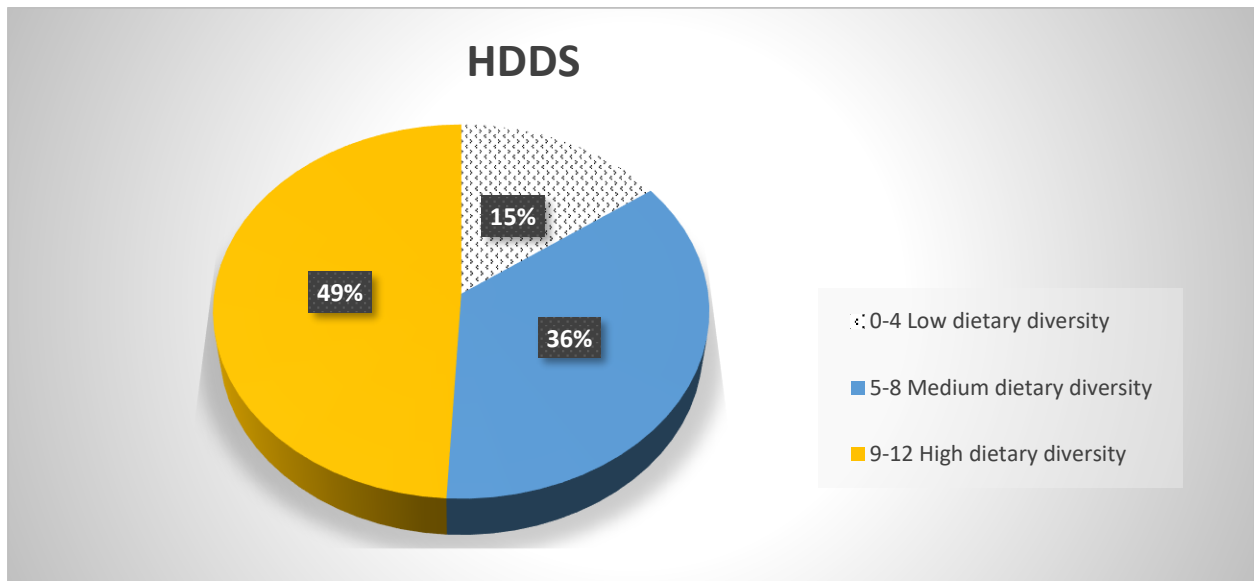


Figure 5. 3: Rural household food utilisation percentages

Source: Research survey

Figure 5.3 above presents food utilisation frequencies using the HDDS measure of rural households in the Mopani District Municipality. The results showed that 49% of the rural households had a higher HDD score, while 36% had a medium HDD score and 15% had low HDD score, respectively. These results indicated that most of the rural households' diet was diverse. As highlighted in the methodology section, a value of zero would mean a low dietary diversity score (HDDS) and the closer the score was to 12, the higher the dietary diversity of the respondent. According to the results, many of the rural households were characterised by households that are less food insecure. These results further indicated that rural households at MDM consumed several different food groups, as HDDS reflects the number of different food groups consumed over a given period of time (seven days for this study was considered). The reason for the importance of HDDS is that a more diversified diet is an important outcome, as it is highly correlated with factors such as household income (even in very poor households). An increase in household expenditure from additional income is associated with an increased quantity and quality of the diet.

### 5.4. Stability of food

Table 5. 4: Rural households' food stability questions.



Questions:0=strongly disagree; 1=disagree; 2=I do not know; 3=agree and 4=strongly agree	Frequency	Percentage %
1. Do you always have access to sufficient food?	0=21	12.14
	1=28	16.18
	2=0	0
	3=110	63.58
	4=14	8.1
2. Have you ever experienced a temporal or permanent loss of access to the resources needed to consume adequate food?	0=8	4.6
	1=55	31.8
	2=12	6.9
	3=93	53.8
	4=5	2.9
3. Do you sometimes run out of food?	0=21	12.1
	1=36	20.8
	2=2	1.2
	3=64	37.0
	4=50	28.9
4. Is climate variability an important cause of unstable access to food?	0=0	0
	1=0	0
	2=1	0.6
	3=30	17.3
	4=142	82.1
5. Have you ever experienced not having food for more than a month?	0=117	67.6
	1=51	29.5
	2=3	1.7
	3=2	1.2
	4=0	0
<b>Total</b>	<b>173</b>	<b>100</b>

Source: Research survey

A five-point Likert scale was used when the rural households of Mopani District Municipality were asked to indicate the extent to which they agreed or disagreed with

the above questions. The Likert scale was coded as follows: 0=strongly disagree; 1=disagree; 2= I do not know; 3=agree and 4=strongly agree. According to Table 5.4, 63.6% (agreed) and 8.1% (strongly agreed) that rural households had access to sufficient food whereas 12.2% (strongly disagreed) and 16.2% (disagreed). Half of the respondents pointed out that they had experienced a temporal or permanent loss of access to resources needed to consume adequate food. The results of the study further showed that a majority of the rural households sometimes ran out of food. In addition, approximately 82% of the respondents strongly agreed that climate variability was an important cause of unstable access to food while 17.3% agreed that climate variability was an important cause of unstable access to food. Furthermore, majority of the respondents disagreed that they did not have food for more than a month. However, it was noted that food was not always available to rural households, and that, such households sometimes did not have access to sufficient food. This meant that these households were food insecure. In consensus with the findings, Matebeni (2018) noted that, if a household has an inadequate access to food on a periodic basis, the household or individual can still be considered food insecure.

### 5.5 ANALYSIS OF FOOD SECURITY STATUS AMONG RURAL HOUSEHOLDS OF MDM

This section presents the food security status of rural households at the Mopani District Municipality and the determinants influencing food security within the district municipality.

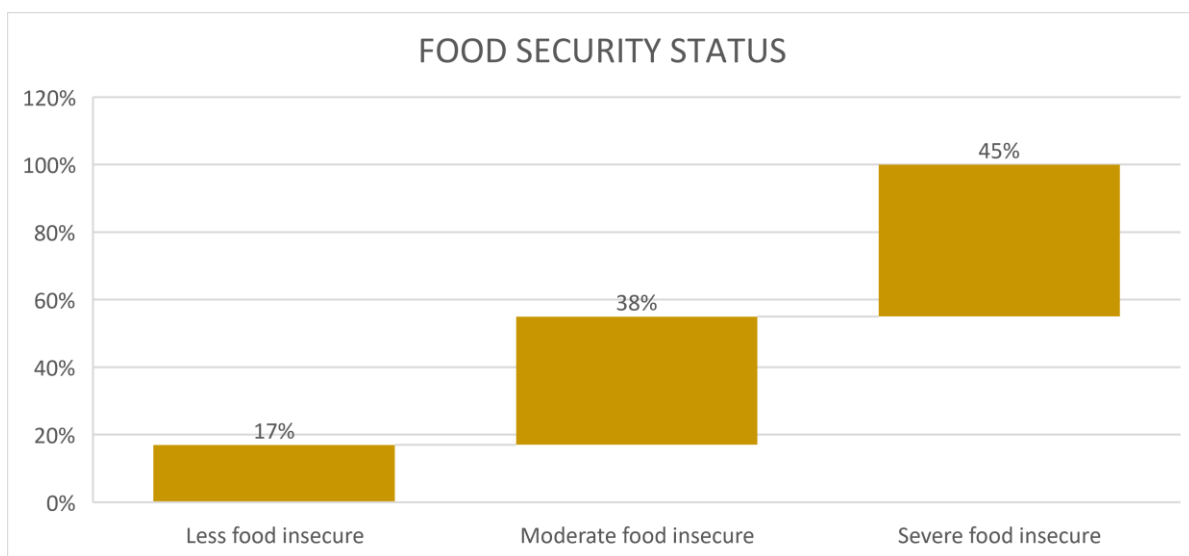


Figure 5. 4: Household food security status of MDM

Source: Research survey

Figure 5.4 indicates the food security statuses of rural households in MDM. The descriptive results of the study revealed that 17% of rural households in MDM were less food insecure whilst 38% of the rural household were presented as moderately food insecure. The results further indicated that, the majority of rural households in MDM were severely food insecure. Therefore, the majority of these households were more food insecure, a few households were less food insecure and 38% were moderately food insecure. In light of the results, MDM was regarded as a municipality with households that range from moderate to severe food insecurity. This was ascribable to MDM's high unemployment rate, where although the majority of these rural households had access to land, such households were inactive in terms of agricultural production, which contributed to households being food insecure. In the analysis, 'less food insecure' was used as a reference term since the interest of the study was on households that ranged from moderate to severe food insecurity, as presented in Table 5.5 below. The model used to arrive at these regression results was the Multinomial Logistic Regression Model.

Given the nature of the observed descriptive statistics, severe food insecure households were dominant in the study area. Food stability is the contributing component that results in households being characterised as severe food insecurity. For instance, from the questions asked on food stability, the majority (82%) of the rural households strongly agreed that climate variability was an important cause of unstable access to food. About 53.8% of the rural households also agreed that they experienced either a temporal or permanent loss of access to the needed resources to acquire and consume adequate food. Climate variability influences food stability in that rural households may not harvest what they expected to harvest. Climatological disturbances can result in a minimal supply of food, which further causes food prices to skyrocket and compounds instability in terms of food supply. This results in disparities between households that can maintain food stability and those households that cannot maintain stability. At MDM, not every household had sufficient funds or resources to acquire adequate food for their families/households.

Table 5. 5: Factors determining food security among households at Mopani District

<b>Dependent variable: Less food insecure vs Moderately food insecure</b>			
<b>Independent variables</b>	<b>B</b>	<b>Wald</b>	<b>Sig.</b>
Intercept	4.356	.000	.999
<b>Household size</b>	.075	.524	.469
<b>Age of household head</b>	-.059	3.194	.074*
<b>Gender of household head</b>	.347	.374	.541
<b>Level of education:</b>			
Never went to school	36.451	.000	.996
Primary school	17.236	.000	.995
Secondary school	18.308	.000	.995
Tertiary	17.038	1.032	.995
<b>Employment status</b>	.708	.000	.310
<b>Household income:</b>			
Over R1000	31.942	536.376	.000***
R1099-R1999	-2.169	2.911	.088*
R2000-R2999	-.684	.581	.446
R3000-R3999	-1.265	1.918	.166
R4000-R4999	-1.653	2.699	1.00*
<b>Source of income:</b>			
Wages	-.369	.041	.839
Salary	.441	.147	.701
Old age pension	-.018	.000	.988
Child support grant	1.818	3.180	.075*
Access to cred for borrowing money	-1.333	3.161	.075*
<b>Dependent variable: Less food insecure vs Severe food insecure</b>			
Intercept	3.137	.000	.999
<b>Household size</b>	-.090	.720	.396
<b>Age of household head</b>	.038	1.323	.250
<b>Gender of household head</b>	-.211	.119	.730
<b>Level of education:</b>			
Never went to school	37.476	.000	.996
Primary school	18.803	.000	.995
Secondary school	19.529	.000	.994
Tertiary	17.300	.000	.995
<b>Employment status</b>	-.508	.386	.535
<b>Household income:</b>			
Over R1000	31.734	.000	.999
R1099-R1999	-2.518	2.783	.095*
R2000-R2999	-.817	.442	.506
R3000-R3999	.528	.201	.654
R4000-R4999	.391	.106	.744
<b>Source of income:</b>			
Wages	-2.054	1.151	.283
Salary	-2.562	4.337	.037**

Old age pension	-1.297	1.362	.243
Child support grant	.994	1.051	.305
<b>Access to credit for borrowing money</b>	-1.771	5.573	.018**
<b>Goodness-of-Fit</b>			
	Chi-Square	df	Sig.
<b>Pearson</b>	296.434	300	.547
<b>Deviance</b>	246.726	300	.989

**Note: \*\*\*, \*\* and \* indicate significance level at 1%; 5% and 10% respectively.**

Source: Research survey

## 5.6 Less food insecure vs Moderately food insecure households

Concerning households that are moderately food insecure, the Multinomial Logistic Regression results revealed that the age of a household head, income greater than R1000, income ranging between R1099 to R1999 and income ranging between R4000 to R4999 per month influenced the household food security status. Income from child support grants and access to credit for borrowing money were also observed to be significant against the household food security status.

### 5.6.1 Age of a household head

A negative relationship at a 10% significance level between the age of a household head and households that are moderately food insecure when compared to households that are less food insecure was found, as shown in Table 5.5 above. These results, therefore, suggested that, as the age of a household head increased, there was a greater chance for a household to be moderately food insecure. Contrary findings were noted by Mango *et al.* (2014) indicating that age influences the food security status of rural households. This is because as the age of the household head increases, there is a high probability of receiving old age grant and pension fund grants which lead to the household having a higher purchasing power. However, these results are not conclusive because the study have discovered that age of a household negatively influence food insecurity and Mango *et al.* (2014) noted that age of household influences food security status.

#### 5.6.2 Household income greater than R1000

When comparing moderately food insecure households with less food insecure households, a positive and statistically significant relationship at 1% level was found towards an income greater than R1000 per month. These results could mean that as income increased, there was a possibility of increase to moderately food insecure households.

#### 5.6.3 Household income between R1099 to R1999

Household income ranging between R1099 to R1999 per month was found to be negatively and statistically significant at 10% level when comparing moderately food insecure households with less food insecure households. This implied that, a rise in income within a household was likely to trigger a moderately food insecure household.

#### 5.6.4 Household income between R4000 to R4999

The income between R4000 to R4999 was found to be negatively and statistically significant at 10% level when comparing moderately food insecure households with less food insecure households. The negative relationship inferred that, households earning between R4000 and R4999 per month were probably moderately food insecure.

#### 5.6.5 Child support grant

Child support grant directly influences the food security status of households. This variable was found to be significant at 10% level with a positive coefficient of 1.818 when comparing moderately food insecure households with less food insecure households. The positive coefficient suggested that in households that received child support grants, there was a possibility of moderate food insecurity. Chakona and Shackleton (2019) also shared similar findings, affirming that, social grants alone cannot eradicate food insecurity because the money that they receive is not enough to meet all their household needs. Given the nature of the study results, the child support grant was amongst the factors that indeed influence food security status of rural households. So, therefore the results are conclusive.

#### 5.6.6 Access to credit for borrowing money

Access to credit for borrowing money was among the variables that influenced the food security status of households. When comparing moderate food insecure households with less food insecure households, access to credit for borrowing money had a negative coefficient of -1.333 at 10% significance level. These results revealed that, if households had limited access to credit for borrowing money, there was a higher chance of moderately food insecure households. Contradictorily, access to credit has a positive effect on the food security of rural households as it improves food production, rural households' income, food consumption patterns and contribution to the food security of households (Aidoo *et al.*, 2013; Kehinde and Kehinde, 2020). Due to the observations of the study, the results are not conclusive as previous studies discovered that access to credit had a direct correlation to food security.

#### 5.7 Less food insecure vs Severe food insecure households

Regarding households that are severely/more food insecure, regression results confirmed that single household heads, income above R1000 per month, income from salary and access to credit for borrowing money influenced households towards severe food insecurity over less food insecure households.

##### 5.7.1 Household income between R1099 to R1999

According to Table 5.5, a negative (-2.518) and a significant (10%) relationship between households earning between R1099 to R1999 per month and severe food insecure households compared to less food insecure households was found. This negative influence suggested that, as household income decreases, there was a greater chance of severe food insecure households. This corroborated the existing literature that low income leads to food insecurity, as household heads have limited purchasing power (Ahmed, 2017). Looking at the study observations and previous studies on food security, there is an agreement that household income between R1099 to R1999 determined the food security status of a household. It is conclusive that this socio-economic factor has a direct influence on food security.

### 5.7.2 Income from salary

Generally, income has a direct influence on the households' food security status. Income obtained from salary was found to be negatively and statistically significant at 5% level when comparing severe food insecure households with less food insecure households. The explanation for the negative relationship could be that, as long households were acquiring income through salary, there was a probability of severe food insecure households.

### 5.7.3 Access to credit for borrowing money

Access to credit for borrowing money was found to be negatively (-1.771) and statistically significant at 5% level when comparing severe food insecure households with less food insecure households. These results inferred that, if households had no access to credit for borrowing money, there was a possibility of severe food insecure households. On the contrary, access to credit was noted to increase food security as rural households would afford to purchase food items (Kehinde and Kehinde, 2020).

## 5.8 COPING STRATEGIES FOR FOOD SHORTAGES IN MDM

This section presents the coping strategies that rural households of Mopani District Municipality employed to alleviate food insecurity.



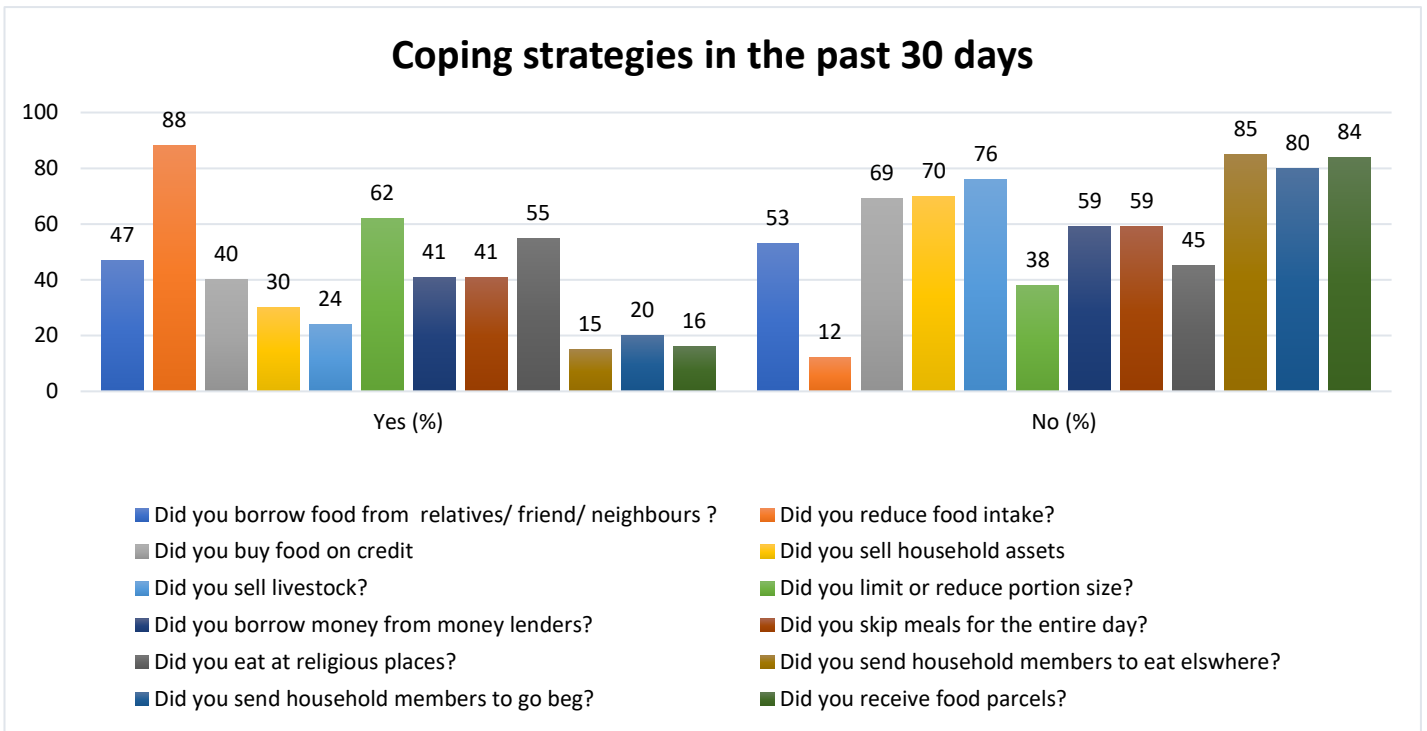


Figure 5. 5: Coping strategies for food shortages

Source: Research survey

Figure 5.5 above presents the coping strategies employed by rural households in Mopani Districts to mitigate food insecurity. In devising strategies to mitigate food insecurity, a majority (88%) of the rural households indicated that they reduced food intake, 62% of the households limited or reduced portion size, 47% borrowed food from relatives and 55% ate at religious places. Descriptive statistics results also showed that a few rural households (12%) did not reduce food intake, 38% did not limit or reduce portion size and 45% of the households did not eat at religious places.

### 5.9 SUMMARY OF HDDS, HFIAS, MULTIPLE LINEAR AND MULTINOMIAL REGRESSION MODELS RESULTS

The results of the study showed that 49% of rural households in Mopani District Municipality had a higher household dietary diversity score, 36% of households had a medium HDD score and few (15%) households had a low HDD score. These results confirmed that majority of the rural households' diet in MDM was diverse. This also indicates that majority of these rural households were less food insecure as the results show that rural households of MDM consumed several different food groups.

As for HFIAS, the descriptive statistic results revealed that several households in MDM ranged from moderately food insecure to severe food insecure with 45% of households being severely food insecure, 38% of households as moderately food insecure and 17% of households as less food insecure. These results suggest that households are experiencing severe food insecurity shocks at the study area, with 17% of the rural households being less food insecure. The descriptive statistic results further highlighted that food stability was the contributing component/pillar for these rural households of MDM to be considered severely food insecure. A majority of rural households agreed that climate variability and experiences of either temporal or permanent loss of access to the needed resources to acquire and consume food were major problems. Furthermore, the high unemployment rate of most MDM households resulted in most these households lacking adequate funds to acquire sufficient nutritious food to feed their families. The Multiple Linear Regression Model results confirmed a positive association between food security status and the age of the household head, remittances and access to credit.

The Multinomial Logistics Regression Model results confirmed that, a household income greater than R1000 and child grant positively influence the food security status while the age of the household head, household income between R1099 to R1999, household income between R4000 to R4999, access to credit for borrowing money and income from salary negatively influence the food security status.

## CHAPTER SIX

### CAPRICORN DISTRICT MUNICIPALITY DESCRIPTIVE STATISTICS, EMPIRICAL FINDINGS AND DISCUSSION

#### 6.0 INTRODUCTION

This chapter presents the socio-economic characteristics of all the respondents in Capricorn District Municipality [CDM] as confirmed by descriptive statistics. The chapter also presents the empirical findings and discussion of the Multiple Linear Regression and Multinomial Logistic Regression Models.

Table 6. 1 Basic statistics of all the respondents.

VARIABLES		FREQUENCIES	PERCENTAGES %
Gender	Male	93	53.8
	Female	80	46.2
Level of education	Never went to school	23	13.3
	Primary school	13	7.5
	Secondary school	42	24.3
	Tertiary school	85	49.1
	Abet school	10	5.8
Employment status	Employed	65	37.6
	Unemployed	108	62.4
Household income	Over R1000	25	14.5
	R1099- R1999	25	14.5
	R2000- R2999	49	28.3
	R3000- R3999	23	13.3
	R4000- R4999	17	9.8
	Over R5000	34	19.7
Source of income	Wages	18	10.4
	Salary	46	26.6
	Old Age pension	47	27.2
	Child grant	27	15.6

	Other grants from government	35	20.2
Remittance	No	134	77.5
	Yes	66	22.5
Access to credit for borrowing money	No	115	66.5
	Yes	58	33.5
Access to arable land	No	118	68.2
	Yes	55	31.8
Road condition	Poor	104	60.1
	Good	69	39.9
Assistance from extension officers	No	164	94.8
	Yes	9	5.2
Do you participate in	None	47	27.2
	Formal markets	1	0.6
	Informal markets	82	47.4
	Use the produce for home consumption	43	24.9
	<b>MINIMUM</b>	<b>MAXIMUM</b>	<b>AVERAGE</b>
Age	30	90	60
Household size	1	11	6

Source: Research Survey

Table 6.1 above shows the socio-economic characteristics of the study at CDM. The total sample size of Capricorn District Municipality was 173 rural households. Male respondents (53.4%) were more compared to the female respondents (46.2%). Also, the respondents depended mostly on old age pension grants (27.2%), followed by the respondents who received a salary (26.6%). The largest income of the respondents ranged from R2000 to R2999 (28.3%). Most of the respondents (47.4%) participated in the informal market and a few respondents (24.9%) used their produce for home consumption. Furthermore, descriptive statistics results revealed that most of the respondents never received any assistance from extension officers. Majority (68.2%) of the respondents had access to arable land. About 68% of the respondents rated the road conditions of their village as poor, while 32% rated the condition of the roads as good. Household sizes ranged between a minimum of one and a maximum of 11 family members, with an average household size of six members. The youngest and

oldest respondents were between the ages of 30 and 90, respectively, with the sample's average age being 60 years.

The next section presents the food consumption patterns of the Capricorn District Municipality.

Table 6.2 presents the consumption patterns of food groups consumed by the rural households of CDM.

Table 6. 2 :Food consumption patterns

Food groups or types	Consumption status (%)		Consumption frequency (%)	
	Yes	No	Daily	Weekly
1. Any bread, rice, or any other foods made from millet, sorghum, maize, wheat or any other locally available grain	94.2	5.8	53.8	30.6
2. Any potatoes, yams, cassava or any other foods made from roots or tubers	82.6	17.4	17.3	41.0
3. Any vegetables	97.1	2.9	42.2	40.5
4. Any fruits	94.2	5.8	45.1	30.1
5. Any beef, pork, lamb, rabbit, chicken, duck, other birds and organ meats	85.5	14.5	22.0	35.8
6. Any eggs	86.1	13.9	29.5	39.9
7. Any fresh or dried fish or shellfish	43.3	56.7	9.8	19.1
8. Any food made from beans, peas and lentils	68.2	31.8	20.2	29.5

9. Any yoghurt, milk, or milk products	85.5	14.5	29.5	28.3
10. Any food made with oil, fat or butter	82.0	18.0	40.5	24.9
11. Any sugar	93.6	6.4	69.4	15.0
<b>Average</b>	<b>82.94</b>	<b>17.06</b>	<b>54.20</b>	<b>45.80</b>

Source: Research Survey

Table 6.2 indicates that most of the respondents (82.94%) consumed the food groups shown in the table, although at a slightly higher rate than the consumption rate in MDM. The findings of the study revealed that, on average the tabulated food groups were consumed more on a daily and weekly basis (54.80%; 45.80%, respectively).

## 6.1 ANALYSIS OF THE FOUR DIMENSIONS OF FOOD SECURITY

This section presents the food security status of rural households in CDM using the four dimensions of food security. The section further presents the factors influencing food security of rural households in CDM.

### 6.1.1. Availability of food

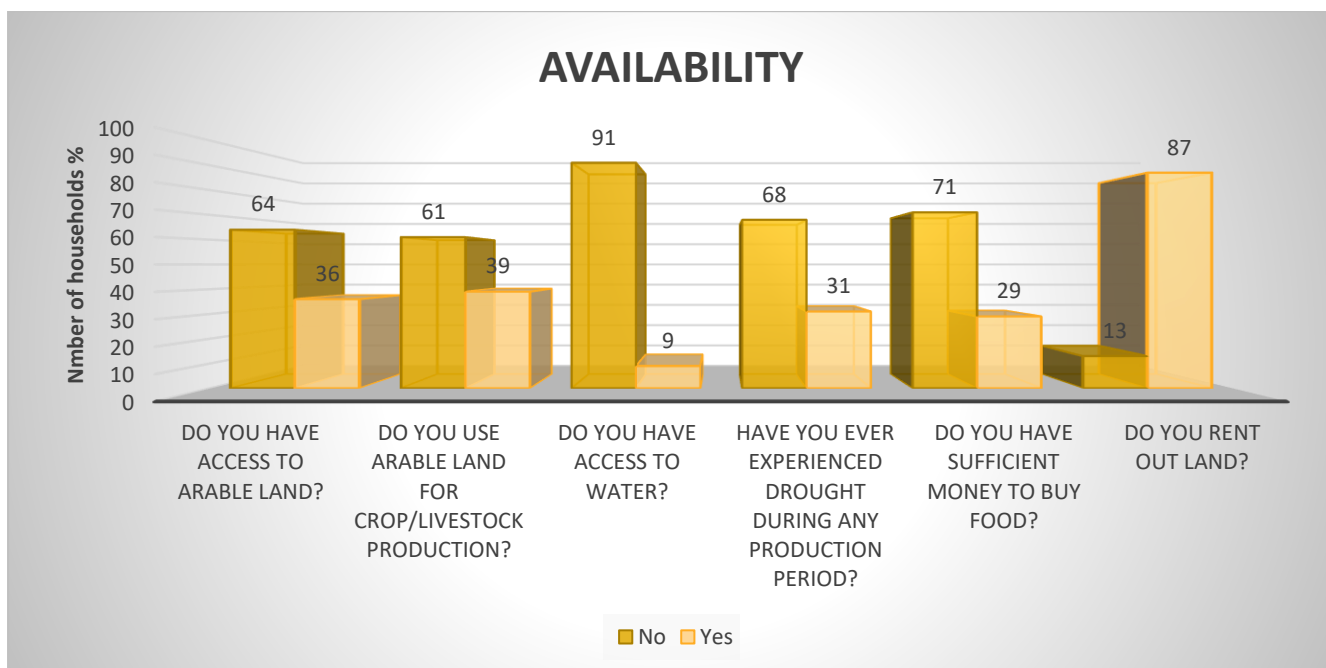


Figure 6. 1: Food availability in Capricorn District

Source: Research Survey

Rural households in the Capricorn District Municipality were asked questions regarding the availability of food. A questionnaire was used as a data collection instrument. Figure 6.1 presents the food availability of rural households in Capricorn District Municipality. The results of the study revealed that 64% of rural households did not have access to arable land while 36% had access to arable land. Figure 6.1 further shows that 61% of the respondents did not use arable land for crop/livestock production while 39% used the arable land for crop/livestock production. The results also revealed that a majority (91%) of the respondents did not have access to water. Furthermore, 68% of rural households had experienced drought during their production period. Approximately 71% of the respondents indicated that they did not have sufficient money to buy food. In addition, 87% of the respondents rented out land to make extra income. The results indicated that rural households in the Capricorn District Municipality had important resources for food production. However, rural households of CMD were not largely active in agricultural activities, thus making rural households at CDM to be classified as severe food insecure.

#### 6.1.2. Accessibility of food

The section presents the households' food security status of the Capricorn District Municipality.

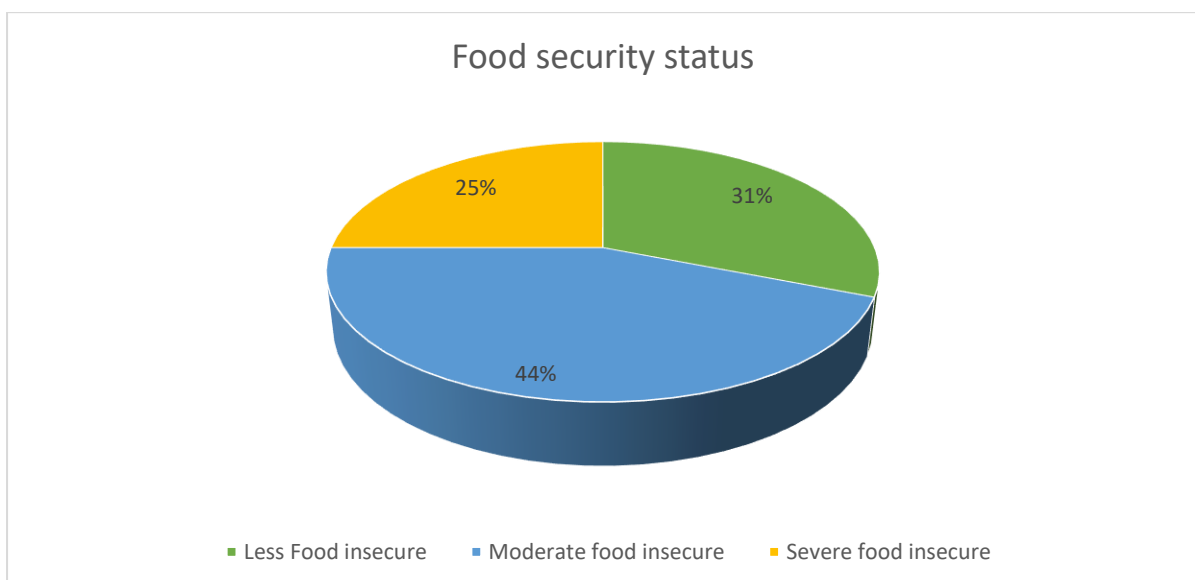


Figure 6. 2: Household food security status of the study area

Source: Research Survey

Figure 6.2 presents the food security status of rural households in the Capricorn District Municipality (CDM). The results of the study indicated that a majority (44%) of rural households were moderately food insecure whilst 31% of rural households were less food insecure followed by 25% of rural households who were severely food insecure. These results suggested that, a few rural households in CDM were severely food insecure. Given the results on food security status from rural households in CDM, the district was categorised by households who were less food insecure as moderately food insecure. The table below presents the empirical results on the determinants of the food security status of rural households in CDM.

## 6.2 DETERMINANTS OF HOUSEHOLD FOOD SECURITY STATUS AMONG RURAL HOUSEHOLDS OF CDM

The study results in Table 6.3 below show the F value of the model,  $R^2$  and adjusted  $R^2$  of the model.

Table 6. 3: Determinants influencing rural households' food security status

<b>Variables</b>	<b>B</b>	<b>SE</b>	<b>Significance</b>
	Dependent variable: HFIAS		
Constant	17.961	3.659	0.000
Gender	-2.042	0.970	0.037**
Age of household head	-0.087	0.045	0.054**
Household size	0.212	0.241	0.381
Level of education	-0.112	0.447	0.802
Employment status	-4.478	1.989	0.026**
Household income	-1.223	0.397	0.002***
Source of income	-1.166	0.588	0.049**
Remittances	1.335	1.154	0.249
Access to credit	2.316	1.066	0.031**
F-value	4.358		
R squared	.850		
Adjusted R squared	.690		
Number of observations	173		

**Note:** \*\*\* and \*\* indicate significance level at 1% and 5%, respectively.



Source: Research Survey

From the ten predictor variables fitted in the Multiple Linear Regression Model, six variables (gender, age of household head, employment status, household income, source of income and access to credit) had a significant influence on households' food security. Five of these significant variables had negative signs (gender, age of household head, employment status, household income and source of income), implying that an increase in either of these variables is associated with a decrease in the household's food security. Access to credit had a positive sign, implying that an increase in this variable is associated with household food security.

#### 6.2.1 Gender

The results of the model revealed that gender was negatively associated with HFIAS at 5% significance level. This meant that if the gender of rural households was both male and female who participated in agricultural activities, food production could be enhanced and ultimately translate into food security.

#### 6.2.2 Age of a household head

HFIAS and age of household head showed a negative relationship at 1% significance level. These results suggested that an increase by a year in the age of a household head can decrease the chance of a household becoming food secure. On the contrary, Zhou *et al.* (2019) found the age of a household head to be significant and as an important factor influencing food security status. Also, Beyene and Muche (2010) highlighted that as the age of the household head increased, it was assumed that a household head could acquire more knowledge, experience, and the chance to become more food secure increases with age. Given the above mentioned, the study therefore concludes that the age of a household head does not have a direct influence on food security status of the household.

#### 6.2.3 Employment status

A negative association between employment status and HFIAS was confirmed by regression estimates with the significance level of 5%. These results suggested that if households were not employed, there was a higher probability of such households experiencing food insecurity. Similar findings were presented by Chopra *et al.* (2009)

indicating that household food insecurity in South Africa is linked with socio economic status such as income, employment, and food expenditure. The results of the study are conclusive because several authors indicated that the employment status have a direct influence on food insecurity status of households. Altman and Ngandu (2010) stated that the fewer the jobs, the higher the unemployment rate, the lower household income will be and the higher the levels of food insecurity.

#### 6.2.4 Household income

The results confirmed that there was a negative relationship between household income and HFIAS at a significance level of 1%. This implied that if a household did not receive any income, it was likely to experience food insecurity shocks. Contrary to these findings, Sekhampu (2013) found household income to be a significant predictor that influenced food security. Sekhampu (2013) also noted household income as one of the important factors that determine food security as it determines how much can be spent on the various needs of a household. The results are not conclusive because the study have discovered that household income negatively influence food security. Whilst Kakota *et al.* (2015) showed household income as a significant determinant of households' food insecurity. Thus, simplifying evidence that household income has a direct influence on food security.

#### 6.2.5 Source of income

Source of income was negatively associated with HFIAS with the significance level of 5%. The results suggested that if a household depended only on one source of income, such a household was likely to experience food insecurity.

#### 6.2.6 Access to credit for borrowing money

Access to credit for borrowing money showed a positive relationship to HFIAS at a significance level of 5%. The results of the study suggested that if a household had access to credit for borrowing money, there was a probability of that household being food secure. On the contrary, Ngema *et al.* (2018) and Acheampong *et al.* (2022) found that access to credit negatively influence food security status of households. With the given study observations, it not conclusive as to which factor influenced food security status of households.

### 6.3 Utilisation of food

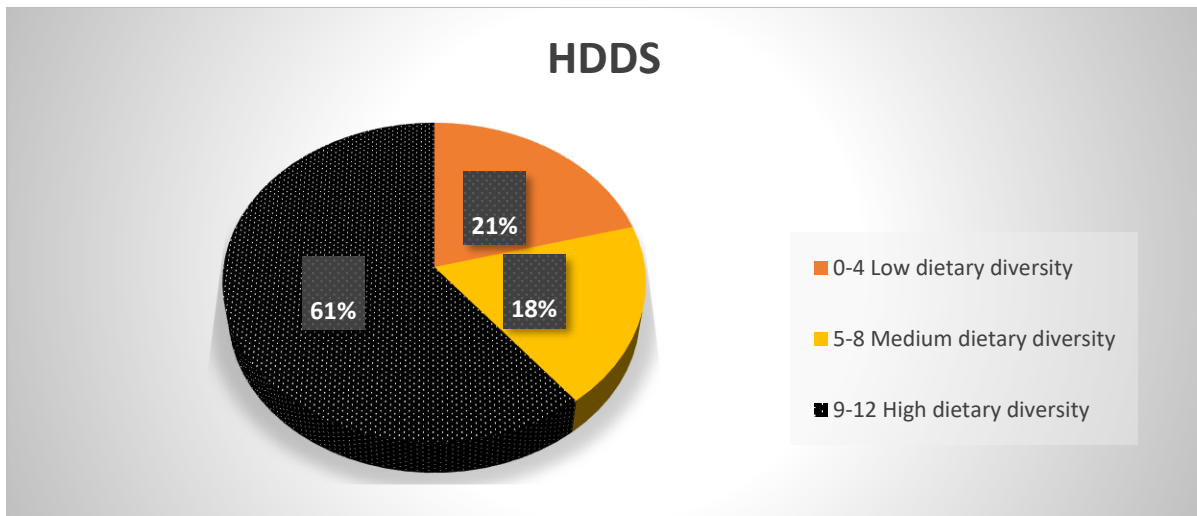


Figure 6.3: Rural household food utilisation percentages

Source: Research Survey

Household dietary diversity score was used to check how diverse the households' diet was. Figure 6.3 shows that 61% of rural households in the Capricorn District Municipality had a higher HDD score, while 21% had a medium HDD score and 18% had a lower HDD score. These findings revealed that most of the respondents had a diverse diet. The results of the study further indicated that, rural households of CDM were able to purchase a variety of food and were also able to consume a balanced diet as the HDDS instrument consists of different food groups. With the given results, rural households of Capricorn District Municipality were found to be more dietary diverse.

### 6.4 Stability of food

Table 6. 4: Frequencies and percentages of rural household food stable questions.

Questions: 0=strongly disagree; 1=disagree; 2=I do not know; 3=agree and 4=strongly agree	Frequency	Percentage %
1. Do you always have access to sufficient food?	0=7	4
	1=42	24.3
	2=10	5.8
	3=83	48
	4=31	17.9

2. Have you ever experienced a temporal or permanent loss of access to the resources needed to consume adequate food?	0=18	10.4
	1=86	49.7
	2=11	6.4
	3=50	28.9
	4=8	4.6
3. Do you sometimes run out of food?	0=25	14.5
	1=67	38.7
	2=6	3.5
	3=61	35.2
	4=14	8.1
4. Is climate variability an important cause of unstable access to food?	0=3	1.7
	1=9	5.2
	2=10	5.8
	3=59	34.1
	4=92	53.2
5. Have you ever experienced not having food for more than a month?	0=81	46.8
	1=73	42.2
	2=3	1.7
	3=14	8.1
	4=2	1.2
<b>Total</b>	<b>173</b>	<b>100</b>

Source: Research Survey

A five-point Likert scale was used to address food stability as the last pillar of food security. The respondents had to indicate the extent to which they agreed or disagreed with the questions given in the questionnaire. The five-point Likert scale was coded as follows: 0=strongly disagree; 1=disagree; 2= I do not know; 3=agree and 4=strongly agree. The results showed that 48% of rural households in the Capricorn District Municipality agreed that they always had access to sufficient food, 17.9% strongly agreed that they had sufficient food and 24% disagreed that they always had sufficient food. Rural households were asked if they ever experienced a temporal or permanent loss of access to the resources needed to consume adequate food. 49% of the

households disagreed that they ever experienced a temporal or permanent loss of access to the resources needed to consume adequate food while 28.9% of the rural households agreed. About 38.7% of the respondents disagreed to sometimes running out of food whilst 35% sometimes ran out food. The results also showed that a majority of the respondents agreed to climate variability being an important cause of unstable access to food. Furthermore, most of the respondents disagreed to ever experiencing a lack of food for more than a month. With the given results, descriptive results confirmed that rural households in CDM were distinguished as being less food insecure.

### 6.5 ANALYSIS OF FOOD SECURITY STATUS AMONG RURAL HOUSEHOLDS OF CDM.

This section presents the food security status of rural households in the Capricorn District Municipality and the determinants influencing food security within the District Municipality.

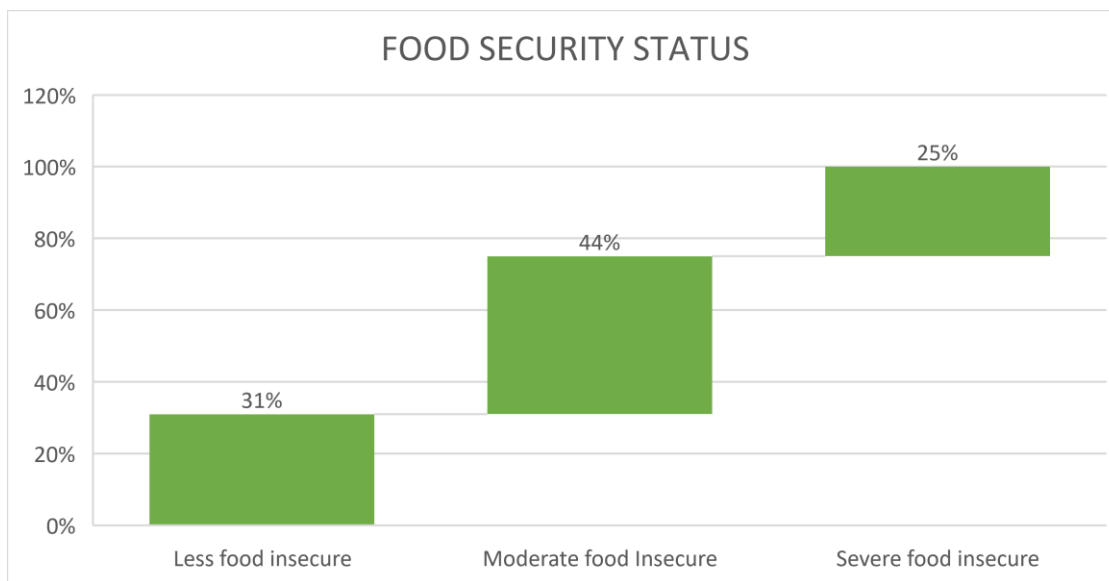


Figure 6. 4: Household food security status of CDM

Source: Research Survey

Figure 6.4 shows the food security statuses of rural households in CDM. The descriptive result of study indicated that 31% of rural households in CDM were less food insecure whilst 44% were categorised as moderately food insecure. Only 25% of the rural households in CDM were severely food insecure. These results suggested that a few households in CDM were found to be severe food insecure and a majority

of the households were noted to be moderately food insecure, while 31% were less food insecure. Given the results on food security from rural households in CDM, the district was categorised by households that ranged from moderate to less food insecure. In the analysis, less food insecure was treated as a reference term since the interest of the study was on households that ranged from moderate to severe food insecure. These results were presented in Table 6.5 below based on the Multinomial Logistic Regression Model.

The study results revealed that the components of food security, namely, food availability and food stability contributed to CDM households' moderate food insecurity. For example, looking at food availability, descriptive statistics results indicated that the majority (71%) of the rural households agreed that they did not have sufficient money to buy food whereas 91% of the rural households agreed that they did not have access to water. Also, about 64% of rural households also agreed that they did not have access to land while 61% agreed that they were not using arable land for crop/livestock production. This showed that with no access to arable land and water, rural households would not be able to produce crops for subsistence purposes. This had the potential trigger and compound food shortages. Hence, rural households in CDM were moderately food insecure, as water is one of the important resources for crop production. These results also showed that food might have been available to households, but they lacked resources/ money to purchase adequate food to feed their families. Thus, an increase in food availability is likely to reduce food insecurity and risks of starvation.

On food stability, many rural households agreed that climate variability was an important factor causing unstable access to food. Therefore, climate variability increases the risk of hunger, and affects all the four components of food security. Climate variability reduces access to food and affects food stability resulting in households not being able to buy sufficient food due to lack of resources. It also affects food production and supply, which lead to high food prices. Furthermore, given the high unemployment rate at CDM, a majority of rural households lacked purchasing power and social grants alone were not enough to sustain purchases of food.

Table 6.5: Factors determining food security among households in Mopani District: Multinomial Logistic Regression Model results.

<b>Dependent variable: Less food insecure vs Moderately food insecure</b>				
Independent variables	B	Std Error	Wald	Sig.
Intercept	-15.832	3.115	25.825	.000
<b>Age of household head</b>	.016	.023	.477	.490
<b>Household size</b>	.035	.111	.098	.755
<b>Gender household head</b>	.649	.446	2.114	.146
<b>Level of education:</b>				
Never went to school	-1.306	1.279	1.042	.307
Primary school	-.610	1.455	.176	.675
Secondary school	-.949	1.246	.580	.446
Tertiary school	-.902	1.226	.541	.462
<b>Employment status</b>	-.100	1.957	.003	.959
<b>Level of income:</b>				
Over R1000	-.167	.996	.028	.867
R1099-R1999	-.621	1.009	.380	.538
R2000-R2999	-.878	.886	.982	.322
R3000-R3999	.307	.760	.163	.686
R4000-R4999	-.199	.842	.056	.813
<b>Source of income:</b>				
Wages	17.975	2.062	75.979	.000***
Salary	16.422	2.084	62.111	.000***
Old age pension	18.560	.780	566.137	.000***
Child support grant	20.022	1.002	399.304	.000***
Other grants from the government	18.074	.000	.000	.999
<b>Access to credit for borrowing money</b>	-.036	.463	.006	.938
<b>Remittances</b>	-.470	.527	.796	.372
<b>Dependent variable: Less food insecure vs Severe food insecure</b>				
Intercept	-12.321	3.560	11.979	.001

<b>Age of household head</b>	-0.044	.030	2.216	.137
<b>Household size</b>	.133	.133	1.006	.316
<b>Gender of household head</b>	1.125	.546	4.250	.039**
<b>Level of education:</b>				
Never went to school	-1.022	1.486	.473	.492
Primary school	-1.014	1.700	.356	.551
Secondary school	-1.496	1.483	1.017	.313
Tertiary school	-1.702	1.461	1.356	.244
<b>Employment status</b>	1.773	1.982	.800	.371
<b>Level of income:</b>				
Over R1000	2.204	1.307	2.845	.092*
R1099-R1999	.434	1.292	.113	.737
R2000-R2999	.423	1.184	.128	.721
R3000-R3999	.272	.985	.076	.782
R4000-R4999	-.008	1.078	.000	.994
<b>Source of income:</b>				
Wages	16.450	2.111	60.716	.000***
Salary	15.677	2.273	47.554	.000***
Old age pension	15.837	1.071	218.564	.000***
Child support grant	16.974	1.127	226.828	.000***
Other grants from the government	13.426	.000	.000	.999
<b>Access to credit for borrowing money</b>	-1.002	.564	3.156	.076*
<b>Remittances</b>	-.896	.599	2.238	.135
<b>Goodness-of-Fit</b>				
	Chi-Square	df	Sig.	
Pearson	367.570	298	.004	
Deviance	297.780	298	.493	

Note: \*\*\*, \*\* and \* indicate significance level at 1%; 5% and 10%, respectively.

Source: Research Survey



### 6.5.1 Less food insecure vs Moderate food insecure households

The results revealed that sources of income, which included wages, salary, old age pension and child support grant influenced households towards being moderately food insecure and the direction of influence for these variables is discussed below.

#### 6.5.1.1 Income from wages

Income obtained from wages was found to be positively and statistically significant at 1% level when comparing moderate food insecure households from less food insecure households as indicated in Table 6.5. This inferred that, as income from wages increased, there was a higher likelihood of moderate food insecure households and a lower chance of less food insecure households. In support of these findings, Altman and Ngandu (2010) highlighted that income from wages is extremely low, given the number of dependants in each household, which contributes to food insecure households. The results are not entirely conclusive because the study discovered that income from wages is one of the determinants that influence food security status. However, Drammeh *et al.* (2019) indicates that food insecurity at the household level is related to several factors, including, low income, level of education, household size, employment status, age, the type of household head and food prices.

#### 6.5.1.2 Income from salary

The salary of a household directly influences the food security status of that household. This variable was found to be significant at 1% level with a positive coefficient of 16.422 when comparing moderate food insecure households with less food insecure households. The positive coefficient suggested that, with households that were earning a salary, there was a possibility of moderate food insecurity households. Ngema *et al.* (2018) indicates that education, receiving infrastructural support (irrigation) positively influence the food security status of households. Given the study observations, income from salary was noted to be one of the determinants that influenced food security status of households. These results are therefore not conclusive.

#### 6.5.1.3 Old age pension grant

Old age pension grant was among the variables which influenced the food security status of households. When comparing moderate food insecure households with less food insecure households, old age pension grant had a positive coefficient of 18.560 at 1% significance level. These results revealed that, if households relied only on an old age pension grant as a source of income, there was a higher probability of being moderately food insecure households.

#### 6.5.1.4. Child support grant

According to Table 6.5, child support grant had a positive coefficient of 20.022 at 1% significance level when comparing moderate food insecure with less food insecure households. The positive coefficient meant that, as the amount of child support grant increased with a household, there was a chance of moderate food insecurity for such households. In support of these findings, Cordero-Ahiman *et al.* (2020) indicated that households that were food insecure had low incomes, which limited their access to food, portion sizes, the number of meals in a day, etc.

#### 6.5.2 Less food insecure vs Severe food insecure households

Multinomial Logistic Regression results revealed that, the gender of a household head, income above R1000 per month, sources of income like wages, salary, old age pension grant and child support grant, influenced household food security. Access to credit for borrowing money was also found to influence household food security and the significance of each variable is explained below.

##### 6.5.2.1 Gender of a household head

For the gender of a household head, a positive coefficient of 1.125 at 5% significance level was found when comparing severe food insecure households with less food insecure households. The positive relationship meant that, male-headed households were likely to be more/severely food insecure. However, it was found elsewhere that a male-headed household was one of the factors that influenced food security as compared to female-headed households, with the latter depending more on agriculture to increase household food levels (Tibesigwa and Visser, 2016). Several authors have indicated that age, gender and level of income has a direct influence on food security (Acheampong *et al.*, 2022). However, Sekhampu (2013) indicated that age, gender, and educational attainment of the household head were not significant predictors of

household food security status. These results are not conclusive because the study observations found that gender of household head indeed influenced food security status of rural households.

#### 6.5.2.2 Household income above R1000

Household income directly influenced the food security status of households. For a household income above R1000 per month, a positive coefficient of 2.204 at 10% significance level was found when comparing severe food insecure households with less food insecure households. These results suggested that, if households continued to earn income above R1000 per month, there was the likelihood of severe food insecure households. Colesman- Jensen *et al.* (2014) also shared comparable findings, indicating that the risk for food insecurity increased when the money to purchase food was inadequate or unavailable.

#### 6.5.2.3 Income from wages

For households obtaining income from wages, a positive relationship at 1% significance level was observed when comparing severe food insecure households with less food insecure households. The positive relationship meant that, if households only depended on wages as a source of income, there was a higher chance of severe food insecurity. Comparable findings were also presented by Altman and Ngandu (2010) who stated that income from wages was low relative to the cost of living and number of dependants in each household, which contributed to food insecurity.

#### 6.5.2.4 Income from salary

The variable measured the source of income obtained by households. This variable was found to be statistically significant at 1% level with a positive coefficient of 15.677 when comparing severe food insecure households with less food insecure households. This implied that, households that obtained income in the form of a salary were likely to be more/severe food insecure.

#### 6.5.2.5 Income from old pension grant

According to Table 6.5, a positive coefficient of 15.837 at 1% significance level was observed when comparing severe food insecure households with less food insecure households. The positive coefficient suggested that, as long households relied on old

pension grant as a source of income, there was a higher probability of severely food insecure households. These results concurred with the findings of Köhler and Borat (2020), who indicated that nearly half of the individuals who live in the poorest areas, that is, 50% of households, reported grant as a source of their household income.

#### 6.5.2.6 Child support grant

Child support grant was among the variables which influenced the food security status of households. This variable was found to be positively and statistically significant at 1% level when comparing severe food insecure households with less food insecure households. These results suggested that, if households had only child support grant as a source of income, there were chances of severe food insecurity in such households. Similar findings were presented by Mturi *et al.* (2012) indicating that many of those who received child support grants lamented that the amount received was inadequate to meet all their needs. Hence, the impact of food insecurity still exists at a household level.

#### 6.5.2.7 Access to credit for borrowing money

For access to credit for borrowing money, a negative coefficient of -1.002 at 10% significance level was observed when comparing severe food insecure households with less food insecure households. The negative coefficient suggested that, if households do not have access to credit for borrowing money, there would be a likelihood of households that were severely food insecure. Similar findings were presented by Olowu (2013), accenting that household heads were struggling to make a livelihood and ensuring the food security of their families without access to credit. The study observations and the previous studies concurred that access to credit and cooperative membership have a positive and significant impact on food security of rural households. It is therefore conclusive that access to credit for borrowing money certainly influences food security status.

### 6.6 COPING STRATEGIES FOR FOOD SHORTAGES IN CDM

This section presents the coping strategies that rural households in the Capricorn District Municipality employed to alleviate food insecurity.

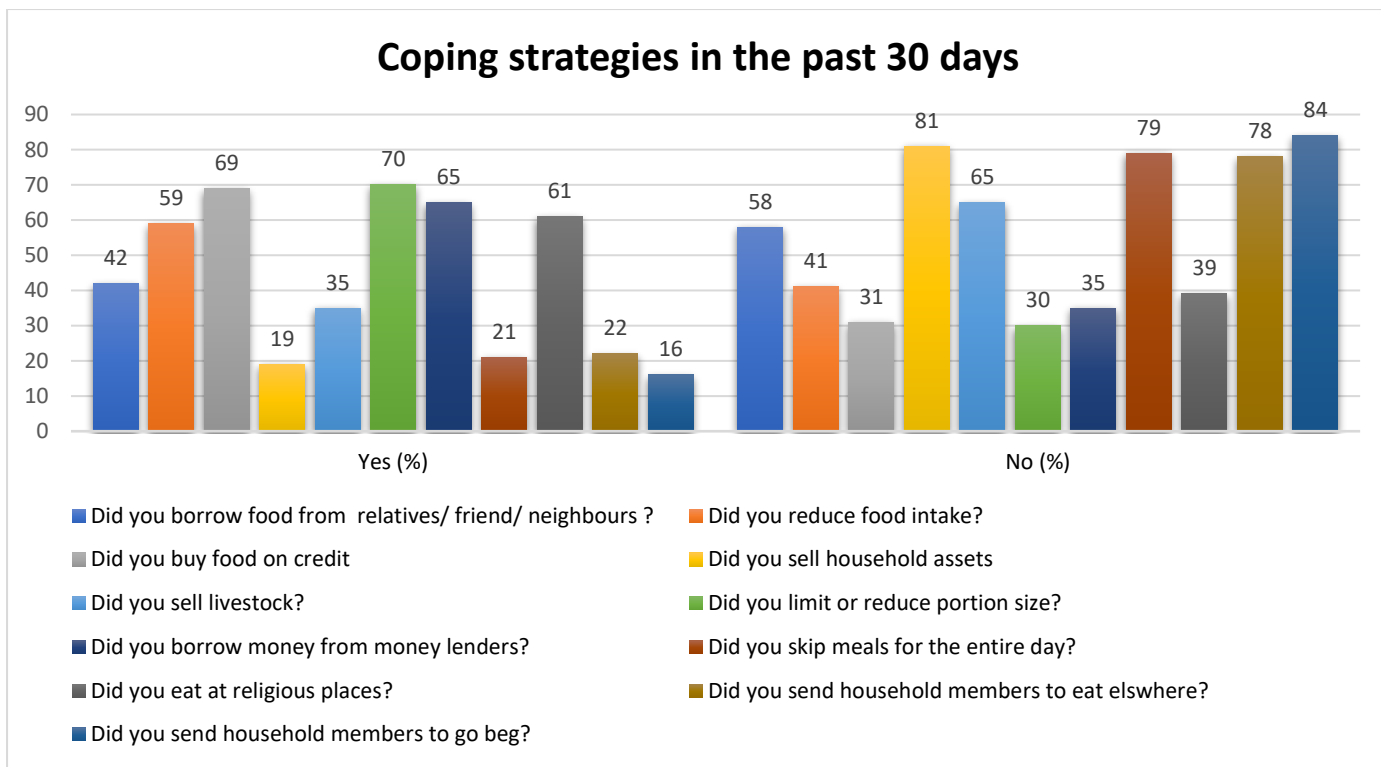


Figure 6. 5: *Coping strategies for food shortages*

Source: Research survey

Figure 6.5 above presents the coping strategies employed by rural households in the Capricorn District Municipality to mitigate food insecurity. The descriptive statistics results of the study showed the most common strategies which were used to mitigate food insecurity. The most common strategies used were as follows; majority (70%) of the households limited or reduced portion size, 59% of the rural households reduced food intake, 69% bought food on credit and 61% ate at religious places. Figure 6.5 also shows that a few rural households (41%) did not reduce food intake, 30% did not limit or reduce portion size, 31% did not buy food on credit and 39% of the households did not eat at religious places.

## 6.7 SUMMARY OF HDDS, HFIAS, MULTIPLE AND MULTINOMIAL REGRESSION MODEL RESULTS

The results of the HDDS revealed that 61% of rural households in CDM had a higher household dietary diversity score, while 21% had a medium score and 18% of rural households had a lower HDD score. These results suggest that majority of the households of CDM had a diverse diet and that the rural households were able to

purchase a variety of balanced meals, as the food group in HDDS shows a variety of food groups. The results further indicate that rural households in CDM are less food insecure.

In terms of HFIAS, the descriptive study results revealed that there are three categories of food security status. These are less food insecure, moderate food insecure and severe food insecure. The results of the study further indicated that 44% of the rural households were categorised as moderately food insecure while 31% were less food insecure and few 25% of the rural households were severely food insecure. Given the descriptive statistic results of food security status in CDM, the results indicated that food availability and food stability were the main components contributing to the households in CDM being characterised as moderately food insecure. Regarding food availability, a majority of rural households did not have sufficient money to buy food. They also did not have access to water and arable land. These results suggest that with no water, access to land and insufficient money to purchase food, these households will not be able to produce crops for subsistence purposes. Hence, the rural households in CDM are moderately food insecure as water is one of the important resources for crop production. From the Multiple Linear Regression Model results, it was found that gender, age of the household head, level of education, employment status, household income and source of income negatively influenced the food security status while access to credit for borrowing money positively influenced food security status. The Capricorn District Municipality is characterised by rural households that range from moderate to less food insecurity.

According to the Multinomial Logistics Regression Model results, the gender of the household head, household income above R1000, income from wages, income from salary, old age pension grant and child support grant, were found to positively influence the food security status while access to credit for borrowing money negatively influenced food security status.

## CHAPTER SEVEN

### RESEARCH SUMMARY, CONCLUSIONS AND POLICY RECOMMENDATIONS

#### 7.0 INTRODUCTION

This chapter presents a summary of the empirical results, conclusions drawn from the study as well as policy recommendations. The chapter first presents a one-on-one mapping of the objectives outlined in the first chapter in light of the major findings inferred from the analytical chapters. This will lead to the general conclusions of the study and policy recommendations based on the study's results.

#### 7.1 RESEARCH SUMMARY

This section summarises the major findings from the Mopani and Capricorn District Municipalities to make extrapolations in relation to the hypotheses of the study. The aim of this study was to analyse food security using food availability, access, utilisation, and stability among rural households of Capricorn and Mopani Districts in the Limpopo Province of South Africa.

The first objective of the study was to profile the socio-economic characteristics of rural households in the Capricorn and Mopani District Municipalities.

The second objective of the study was to assess food consumption patterns of rural households in the Capricorn (CDM) and Mopani District Municipalities (MDM). The major findings drawn from the analytical results were that rural households in MDM had diverse diets, and such households consumed different nutritious food. At CDM, most of the respondents (82.94%) consumed the food groups shown in the HDDS table at a slightly higher rate than the consumption rate at MDM.

The third objective was to determine the food security status of rural households in the Capricorn and Mopani District Municipalities in terms of the four dimensions of food security. The hypothesis made considering this objective was that rural households in the Capricorn and Mopani District Municipalities are not food secure. The major finding drawn from the analytical results was that, at MDM, the age of the household head, marital status, remittances, and access to credit had a significant influence on the food security status. The influence of these variables resulted in several households in MDM characterised as moderately food insecure to severely food insecure. At MDM,

food stability was found to be the contributing factor of rural households being considered as moderate to severe food insecure. At CDM, the gender, age of the household head, level of education, employment status, household income and source of income negatively influenced food security status while access to credit positively influenced food security status. This resulted in CDM rural households categorised as less food insecure to moderate food insecure. Still at CDM, food availability and food stability were observed to be the contributing components to rural households in CDM characterised as less to moderate food insecure.

The fourth objective of the study was to examine the determinants of food security among rural households in the Capricorn and Mopani District Municipalities. The principal hypothesis linked to this objective was that socio economic factors do not influence food security status. The results indicated that factors such as household income greater than R1000, child support grant, age of the household head, single household head, married household head, household income between R1099 to R1999, household income between R4000 to R4999, access to credit for borrowing money and income from salary influence the food security status of households at MDM. At CDM, variables which include the gender of the household head, household income above R1000, income from wages, income from salary, old age pension grant, child support grant and access to credit influence the food security status of rural households.

Objective five of the study sought to identify strategies used by rural households to enhance food security status in the Capricorn and Mopani District Municipalities. The findings revealed that at MDM, the most common strategies used were reduction or limitation of food intake, or reduction of food portion size, borrowing food from relatives and eating at religious places. The findings also highlighted that rural households in CDM limited or reduced food portion size, reduced food intake, bought food on credit and rural households ate at religious places to combat food shortages.

## 7.2 CONCLUSIONS

The results of the study found that rural households in MDM are classified as moderately food insecure to severely/more food insecure. On the other hand, CDM



rural households ranged from less food insecure to moderately food insecure. The hypothesis was that rural households in the Capricorn and Mopani District Municipalities are not food secured. The hypothesis was rejected because the results confirmed that, rural households in MDM were classified as ranging from moderately food insecure to severely/more food insecure while CDM rural households ranged from less food insecure to moderately food insecure.

The study observed that socio economic characteristics of rural households influence food security status. The principal hypothesis was that socio economic factors do not influence the food security status of rural households. The hypothesis was rejected because the results of the study confirmed that socio economic characteristics of rural households determine the food security status.

### 7.3 POLICY RECOMMENDATIONS

Based on the study's results, which indicate that the majority of participants experienced moderate to severe food insecurity in their homes, household-level food security is a major problem among these rural households. The problem is triggered by socio economic characteristics of households. Therefore, based on the results of the study, the following policy recommendations are made:

1. Rural households at MDM and CDM have diverse diets, as established by the study results. However, rural households seem to consume more of maize, wheat and sorghum compared to other food groups. This, therefore, calls for relevant stakeholders such as Nutritionists or other health practitioners to educate individuals through workshops or information sessions about healthy eating habits, including the essence of consuming balanced meals that include the 'four food groups' (fruits and vegetable, grain foods, milk and milk products and protein like nuts, seeds, seafood, eggs or poultry and red meat). The information may provide households with vital information on eating healthy and having a variety of nutritious food types, which may also improve food security among households and communities at large. This might also encourage households to consider having food items from each of the 'four food groups' (fruits and vegetable, grain foods, milk and milk products and protein like nuts, seeds, seafood, eggs or poultry and red meat) per meal.

2. Rural households in MDM were found to range from moderately food insecure to severely food insecure while rural households in CDM ranged from less food insecure to moderately food insecure. The contributing component of food security was food stability in MDM whereas food availability and food stability were the components that contributed to households in CDM being classified as less food insecure and moderately food insecure. At the two district municipalities, rural households are mostly categorised as moderately food insecure. Therefore, the Department of Agriculture should, as a strategy, advise rural households to participate primarily in subsistence farming. Furthermore, the households should be advised to focus their agriculture on crops and livestock that will enable them to enjoy diverse and balanced diets. If well done, the farming will improve food availability, food stability and food utilisation among households. Such households may be able to go beyond producing food solely for subsistence purposes, but also for commercial purposes. The income generated from selling their produce may also assist households to acquire additional food types which will further improve their household food security status. In addition, lack of utilisation of land has led to rural households lacking food availability and food stability. Thus, the government/extension officers must educate rural households about the importance of utilising arable land at their disposal for subsistence purposes. Moreover, the government should provide rural households with financial, material and other support (for instance, an input loan facility) to utilise arable land at their disposal for subsistence purposes. This will help to improve food security and affordability.
3. From both municipalities (MDM and CMD), it was found that socio economic factors such as level of income and sources of income, particularly social grants significantly influence the food security status of households. To overcome this challenge, organisations which focus on rural development, poverty alleviation, to mention but a few (the government, rural department and land reform, extension officers and the national Department of Public Works), should empower individuals within households to participate in development programmes such as farming, tourism, etc., which are commonly implemented among communities. This may assist households to improve their livelihoods by acquiring skills that can assist them in creating businesses and employment

opportunities for themselves and other individuals in their communities. The success of this intervention may lead to diverse sources of income and eventually enhance the food security situation of a household, as income remains a major factor that influences food security.

4. It was noted at MDM and CDM that reduced portions of food size, reduced food intake, and eating at religious places were the common strategies employed to overcome food shortages among rural households. This calls for the Department of Agriculture, local and district municipalities to assist and empower households to make use of the available arable land for farming, particularly vegetable production. These officials may further assist by providing production inputs such seeds/seedlings, fertilizers, water for irrigation, etc. This may enable rural households to produce sufficient food and perhaps even minimise food shortages. Furthermore, this may eventually promote food availability, food utilisation and food access among households and communities at large.

## LIST OF REFERENCES

- Abu, G.A. and 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 (IJFAEC)*, 4, pp.55-68.
- Acheampong, P. P., Obeng, E. A., Opoku, M., Brobbey, L., & Sakyiamah, B. (2022). Does food security exist among farm households? Evidence from Ghana. *Agriculture & Food Security*, 11(1), 1-13.
- Abdul-Jalil, M.A. (2015). *Determinants of access to credit and its impact on household food security in Karaga district of the Northern region of Ghana* (Doctoral dissertation).
- Aborisade, B. and Bach, C. (2014). Assessing the pillars of sustainable food security. *Eur Int J Sci Technol*, 3(4), pp.117-125.
- Adenike, A.A. (2016). The effect of family planning methods on food security in Oyo State, Nigeria. *J. Life Sci*, 10, pp.100-112.
- African Arguments Report. (2020). Coronavirus in Africa tracker: Covid-19 in Africa Available online: <https://africanarguments.org/2020/11/covid-19-in-africa-what-if-there-is-a-second-wave/> [Accessed: 01 August 2020]
- Agidew, A.M.A. and Singh, K.N. (2018). Determinants of food insecurity in the rural farm households in South Wollo Zone of Ethiopia: the case of the Teleyayen sub-watershed. *Agricultural and Food Economics*, 6(1), p.10.
- Agwu, A.E., Egbule, C.L., Amadu, F.O., Morlai, T.A., Wollor, E.T. and Cegbe, L.W. (2012). Linkages among key actors in the climate change and food security innovation system in Nigeria, Sierra Leone and Liberia. *Journal of Agricultural Extension*, 16(2), pp.34-51.
- Ahmed, U.I., Ying, L., Bashir, M.K., Abid, M. and Zulfiqar, F. (2017). Status and determinants of small farming households' food security and role of market access in enhancing food security in rural Pakistan. *PLoS ONE*, 12, e0185466.

- Aidoo, R., Mensah, J.O. and Tuffour, T. (2013). Determinants of household food security in the Sekyere-Afram plains district of Ghana. *European Scientific Journal*, 9(21).
- Ali, A. and Khan, M. (2013). Livestock ownership in ensuring rural household food security in Pakistan. *J Anim Plant Sci*, 23(1), pp.313-8.
- Aliber, M. and Hart, T.G. (2009). Should subsistence agriculture be supported as a strategy to address rural food insecurity? *Agrekon*, 48(4), pp.434-458.
- Altman M. and Ngandu S. (2010). Would halving unemployment contribute to improved household food security for men and women? *Agenda: Empowering Women for Gender Equity*, 24, pp. 52-65
- Altman, M., Hart, T.G. and Jacobs, P.T. (2009). Household food security status in South Africa. *Agrekon*, 48(4), pp.345-361.
- Anghelache, C., Anghel, M.G., Prodan, L., SACALA, C. and Popovici, M. (2014). Multiple linear regression model used in economic analyses. *Romanian Statistical Review Supplement*, 62(10), pp.120-127.
- Arndt, C., Davies, R., Gabriel, S., Harris, L., Makrelov, K., Robinson, S., Levy, S., Simbanegavi, W., van Seventer, D. and Anderson, L. (2020). Covid-19 lockdowns, income distribution, and food security: An analysis for South Africa. *Global Food Security*, 26, p.100410.
- Bandoh, D.A. and Kenu, E. (2017). Dietary diversity and nutritional adequacy of under-fives in a fishing community in the central region of Ghana. *BMC Nutrition*, 3(1), p.2.
- Barrett, C. B. (2010). Measuring food insecurity. *Science*, 327(5967):825-828.
- Bashir, M.K., Schilizzi, S. and Pandit, R. (2013). Impact of socio-economic characteristics of rural households on food security: the case of the Punjab, Pakistan. *JAPS, Journal of Animal and Plant Sciences*, 23(2), pp.611-618.
- Bayaga, A. (2010). Multinomial logistic regression: usage and application in risk analysis. *Journal of Applied Quantitative Methods*, 5(2).

Battersby-Lennard, J., Fincham, R., Frayne, B. and Haysom, G. (2009). Urban food security in South Africa: case study of Cape Town, Msunduzi and Johannesburg. *Development Planning Division Working Paper Series*, (15).

Beyene, F. and Muche, M. (2010). Determinants of food security among rural households of Central Ethiopia: An empirical analysis. *Quarterly Journal of International Agriculture*, 49(892-2016-65219), pp.299-318.

Berry, E.M., Dernini, S., Burlingame, B., Meybeck, A. and Conforti, P. (2015). Food security and sustainability: can one exist without the other? *Public Health Nutrition*, 18(13), pp.2293-2302.

Bhorat, H. and Kanbur, S.R. (eds.). (2006). *Poverty and policy in post-apartheid South Africa*. HSRC Press.

Boatema, S., Drimie, S. and Pereira, L. (2018). Addressing food and nutrition security in South Africa: A review of policy responses since 2002. *African Journal of Agricultural and Resource Economics*, 13(3), pp.264-279.

Bogale, A. (2012). Vulnerability of smallholder rural households to food insecurity in Eastern Ethiopia. *Food Security*, 4(4), pp.581-591.

Bureau for Food and Agricultural Policy (BFAP) Baseline (2013). *Agricultural outlook 2018 -2027*. Available online: <https://www.bfap.co.za> [Accessed:19 May 2019]

Business live. (2020). The latest of coronavirus coverage. Available online: <https://www.businesslive.co.za/news/latest-covid-19-coronavirus-coverage/> [Accessed: 11 July 2020]

Capricorn District Municipality Integrated Development Plan (CDM IDP). (2016/2017). Available online: <https://cdm.org.za/attachments/article/316/Draft%202016-17%20-%202020-21%20IDP-Budget.pdf> [Accessed: 19 May 2019]

Capricorn District Municipality Integrated Development Plan (CDM IDP). (2019/2020). Available online: <http://cdm.org.za/public-notice/1005-2019-2020-draft-idp-budget-review> [Accessed: 16 January 2019]

Carletto, C., Zezza, A. and Banerjee, R. (2013). Towards better measurement of household food security: Harmonizing indicators and the role of household surveys. *Global Food Security*, 2(1), pp.30-40.

Chakona, G. and Shackleton, C.M. (2017). Local setting influences the quantity of household food waste in mid-sized South African towns. *PLoS One*, 12(12), p.e0189407.

Chakona, G. and Shackleton, C.M. (2019). Food insecurity in South Africa: to what extent can social grants and consumption of wild foods eradicate hunger? *World Development Perspectives*, 13, pp.87-94.

Chopra, M., Lawn, J.E., Sanders, D., Barron, P., Karim, S.S.A., Bradshaw, D., Jewkes, R., Karim, Q.A., Flisher, A.J., Mayosi, B.M. and Tollman, S.M. (2009). Achieving the health Millennium Development Goals for South Africa: challenges and priorities. *The Lancet*, 374(9694), pp.1023-1031.

Coates, J., Swindale, A. and Bilinsky, P. (2006). Household food insecurity access scale (HFIAS) for measurement of food access: indicator guide. *Food and Nutrition Technical Assistance Project, Academy for Educational Development, Washington, D.C.* Available online:<http://www.fantaproject.org/monitoring-and-evaluation/household-food-insecurity-access-scale-hfias>. [Accessed: 15 August 2019].

Coleman-Jensen, A., Gregory, C. and Singh, A. (2014). Household food security in the United States in 2013. *USDA-ERS Economic Research Report*, (173).

Cordero-Ahiman, O.V., Vanegas, J.L., Beltrán-Romero, P. and Quinde-Lituma, M.E. (2020). Determinants of food insecurity in rural households: the case of the Paute River Basin of Azuay Province, Ecuador. *Sustainability*, 12(3), p.946.

Crush, J. and Frayne, B. (2010). *The invisible crisis: urban food security in Southern Africa*.

Crush, J. and Riley, L. (2018). Rural bias and urban food security. *Urban Food Systems Governance and Poverty in African Cities*, p.42.

Crush, J., Hovorka, A. and Tevera, D. (2011). Food security in Southern African cities: the place of urban agriculture. *Progress in Development Studies*, 11(4), pp.285-305.

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

Department of Agriculture, Forestry & Fisheries (DAFF). (2011/2012). Annual Report. Available online: <https://www.dalrrd.gov.za/Portals/0/Annual%20Report/Annual%20Report%20for%202011%20-%202012.pdf>. [Accessed: 28 May 2019].

Department of Agriculture, Forestry & Fisheries (DAFF). (2013). *National Policy on Food and Nutrition Security*, pp.1-36.

Department of Agriculture, Forestry & Fisheries (DAFF). (2018). Annual Report. Available online: [https://www.gov.za/sites/default/files/gcis\\_document/201811/arfina128-septembera.pdf](https://www.gov.za/sites/default/files/gcis_document/201811/arfina128-septembera.pdf). [Accessed: 13 May 2019].

Development Bank of Southern Africa. (2009). Working Paper 97 - Soaring food prices and Africa's vulnerability and responses: an update.

Devereux, S. and Waidler, J. (2017). *Why does malnutrition persist in South Africa despite social grants, in centre of excellence in food security?* Working paper 1.

D'Haese, S., De Meester, F., De Bourdeaudhuij, I., Deforche, B. and Cardon, G. (2011). Criterion distances and environmental correlates of active commuting to school in children. *International Journal of Behavioral Nutrition and Physical Activity*, 8(1), pp.1-10.

D'Haese, M., Vink, N., Nkuzimana, T., Van Damme, E., Van Rooyen, J., Remaut, A.M., Staelens, L. and 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), pp.468-490.

Du Toit, D.C., Ramonyai, M.D., Lubbe, P.A. and Ntushelo, V. (2011). Food security by Directorate Economic Services Production Economics Unit. *Gen Reports*.



Drammeh, W., Hamid, N. A., & Rohana, A. J. (2019). Determinants of household food insecurity and its association with child malnutrition in Sub-Saharan Africa: A review of the literature. *Current Research in Nutrition and Food Science Journal*, 7(3), 610-623.

Drysdale, R.E., Moshabela, M. and Bob, U. (2019). Adapting the coping strategies index to measure food insecurity in the rural district of iLembe, South Africa. *Food, Culture & Society*, 22(1), pp.95-110.

Economist intelligence unit (EIU). (2016). Available online: <https://country.eiu.com/south-africa> [Accessed: 10 February 2020]

Elias, A., Nohmi, M., Yasunobu, K. and Ishida, A. (2013). Effect of agricultural extension program on smallholders' farm productivity: Evidence from three peasant associations in the highlands of Ethiopia. *Journal of Agricultural Science*, 5(8), p.163.

Esturk, O. and Oren, M.N. (2014). Impact of household socio-economic factors on food security: case of Adana. *Pak J Nutr*, 13(1), pp.1-6.

Export Government. (2019). Available online: <https://www.export.gov/article?id=South-Africa-agricultural-equipment> [Accessed: 13 December 2019]

Food and Agriculture Organisation (FAO). (2002). The state of food insecurity in the world 2001. Rome.

Food and Agricultural Organization of the United Nations (FAO). (2009). From land grab to win-win: seizing the opportunities of international investments in agriculture. Available online: <ftp://ftp.fao.org/docrep/fao/011/ak357e/ak357e00.pdf> [Accessed online: 22 June 2019]

FAO. (2010). Global forest resources assessment 2010 – key findings. Rome. Available online: [foris.fao.org/static/data/fra2010/keyfindings-en.pdf](http://foris.fao.org/static/data/fra2010/keyfindings-en.pdf). [Accessed: 12 April 2019]

FAO. (2008). *Food security information for action: practical guides*. Rome: The EC-FAO Food Security Programme.

FAO. (2016). The state of food and agriculture. Climate change, agriculture and food security. Rome. Available online: <http://www.fao.org/3/i6030e/i6030e.pdf> [Accessed: 11 January 2020]

FAO. 2017. The future of food and agriculture. Trends and challenges. Rome. Available online: <http://www.fao.org/3/i6583e/i6583e.pdf> [Accessed: 16 October 2020]

FAO. 2018. The state of food and agriculture 2018. Migration, agriculture and rural development. Rome. Available online: <http://www.fao.org/3/I9549EN/i9549en.pdf> [Accessed online: 10 December 2020]

Farzana, F.D., Rahman, A.S., Sultana, S., Raihan, M.J., Haque, M.A., Waid, J.L., Choudhury, N. and Ahmed, T. (2017). Coping strategies related to food insecurity at the household level in Bangladesh. *PLoS one*, 12(4), p.e0171411.

Farmers weekly. (2012). Farming teaching a new generation. Available online: <https://www.farmersweekly.co.za/article> [Accessed:09 February 2019]

Fisher, M.R. (2018). Environmental biology. Available online: <https://openoregon.pressbooks.pub/envirobiology/chapter/8-1-food-security/> [Accessed: 10 December 2019]

Food forward South Africa (FFSA). (2020). Available online: <https://foodforwardsa.org/> [Accessed: 08 September 2021]

Food and Agriculture Organisation. (2020). Africa regional overview of food security and nutrition: containing the damage of economic slowdowns and downturns to food insecurity in Africa.

Food and Agriculture Organization. (2010). The state of food insecurity in the world. Addressing food insecurity in protracted crises, Rome.

Food and Nutrition Technical Assistance (FANTA) project. (2004). Measuring Household Food Insecurity Workshop, Workshop Report. Food and Nutrition Technical Assistance Project, Academy for Educational Development. Washington, D.C.

Godfray, H.C.J., Beddington, J.R., Crute, I.R., Haddad, L., Lawrence, D., Muir, J.F., Pretty, J., Robinson, S., Thomas, S.M. and Toulmin, C. (2010). Food security: the challenge of feeding 9 billion people. *Science*, 327(5967), pp.812-818.

Greyling, J.C., Vink, N. and Mabaya, E. (2015). South Africa's agricultural sector twenty years after democracy (1994 to 2013). *Professional Agricultural Workers Journal*, 3(1), p.10.

Gujarati, D (2002). *Essentials of econometrics*. McGraw–Hill, New York, pp.137.

Gundersen, C. and Gruber, J. (2001). The dynamic determinants of food insufficiency. In *Second food security measurement and research conference*, 2, pp. 11-2. Food Assistance and Nutrition Research Report.

Gundersen, C. and Ziliak, J.P. (2014). Childhood food insecurity in the US: trends, causes, and policy options. *The Future of Children*, pp.1-19.

Hendriks, S. (2013). South Africa's National Development Plan and New Growth Path: reflections on policy contradictions and implications for food security. *Agrekon*, 52(3), pp.1-17.

Hendriks, S. (2014). Food security in South Africa: status quo and policy imperatives. *Agrekon*, 53(2), pp.1-24.

Headey, D. (2011). Rethinking the global food crisis: the role of trade shocks. *Food Policy*, 36(2), pp.136-146.

Integrated food security strategy. (2002). The integrated food security strategy for South Africa. Available online: <http://extwprlegs1.fao.org/docs/pdf/saf149624.pdf> [Accessed: 01 May 2020]

International Food Policy Research Institute. (2017). Available online: <http://www.ifpri.org/topic/global-hunger-index> [Accessed: 01 May 2019]

International Fund for Agricultural Development (IFAD). (2012). Annual report: Stresses Growth, Transparency and Response to Food Security challenges. Available online: <http://sdg.iisd.org/news/ifad-2012-annual-report-stresses-growth-transparency-and-response-to-food-security-challenges/> [Accessed: 03 April 2020]

- Jacobs, P. (2009). Agricultural market reforms and the rural poor in South Africa. Available Online: <http://www.plaas.org.za/newsevents/wom/papers/working-on-the-margins-conference-paper-peter-jacobs/file> [Accessed: 07 July 2019].
- Jebran, K., Abdullah, A., Iqbal, A. and Ullah, I. (2016). Effects of remittances on per capita economic growth of Pakistan. *Pakistan Business Review*, 18(1), pp.1-18.
- Joubert, L. (2021). National food security. Survival of commercial farmers. Available online: <https://southafrica.co.za/national-food-security.html> [Accessed: 14 June 2021]
- Kakota, T., Nyariki, D., Mkwambisi, D., & Kogi-Makau, W. (2015). Determinants of Household Vulnerability to Food Insecurity: A Case Study of Semi-Arid Districts in Malawi. *Journal of International Development*, 27(1), 73-84.
- Kearney, J. (2010). Food consumption trends and drivers. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 365(1554), pp.2793-2807.
- Kehinde, A. and Kehinde, M. (2020). The impact of credit access and cooperative membership on food security of rural households in south-western Nigeria. *Journal of Agribusiness and Rural Development*, 57(3), pp.255-268.
- Kennedy, E. (2002). Guest editorial: the new faces of food insecurity and hunger.
- Koffio-Tessio, E.M., Tossou, Y.H. and Homevor, K.A. (2005). March. Impact of education on agricultural productivity in sub-Saharan Africa. In a "Global Conference on Education Research in Developing Countries", Prague, Czech Republic, 31.
- Köhler, T. and Borat, H. (2020). COVID-19, social protection, and the labour market in South Africa: Are social grants being targeted at the most vulnerable? Development Policy Research Unit Working Paper 202008. DPRU, University of Cape Town.
- Kothari, C.R. (2004). *Research methodology: methods and techniques*. New Age International, pp.36.
- Kyaw, D. (2009). *Rural Household's food security status and coping: strategies to food insecurity in Myanmar*. Institute of Developing Economies, Japan External Trade Organization.

- Labadarios, D., Davids, Y. D., Mchiza, Z. and Weir-Smith, G. (2009). *The assessment of food insecurity in South Africa*. Pretoria: Human Sciences Research Council.
- Lubbe, S., Klopper, R. and Rugbeer, H. (2007). The matrix method of literature review.
- Lutz, W., Scherbov, S., Prskawetz, A., Dworak, M. and Feichtinger, G. (2002). Population, natural resources, and food security: Lessons from comparing full and reduced-form models. *Population and Development Review*, 28, pp.199-224.
- Mail & Guardian (24 May 2019). Business report: change for climate a risky business. Available online: [www.mg.co.za](http://www.mg.co.za). [Accessed: 7 June 2019].
- Mail & Guardian. (2018). The complex insecurity of hunger in South Africa. Available online: <https://mg.co.za/article/2018-10-26-00-the-complex-insecurity-of-hunger-in-south-africa/> [Accessed 02 March 2020]
- Mail & Guardian. (2020). Regenerative farming is vital to ensure food security. Available online: <https://mg.co.za/opinion/2021-06-07-regenerative-farming-is-vital-to-ensure-food-security/> [Accessed: 07 June 2019].
- Mango, N., Zamasiya, B., Makate, C., Nyikahadzoi, K. and Siziba, S. (2014). Factors influencing household food security among smallholder farmers in the Mudzi district of Zimbabwe. *Development Southern Africa*, 31(4), pp.625-640.
- Mark, A.B., Poulsen, M.W., Andersen, S., Andersen, J.M., Bak, M.J., Ritz, C., Holst, J.J., Nielsen, J., de Courten, B., Dragsted, L.O. and Bügel, S.G. (2014). Consumption of a diet low in advanced glycation end products for 4 weeks improves insulin sensitivity in overweight women. *Diabetes Care*, 37(1), pp.88-95.
- Marill, K.A. (2004). Advanced statistics: linear regression, part II: multiple linear regression. *Academic Emergency Medicine*, 11(1), pp.94-102.
- Masekoameng, M. and 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), pp.275-283.

Masipa, T. (2017). The impact of climate change on food security in South Africa: current realities and challenges ahead. *Jàmbá: Journal of Disaster Risk Studies*, 9(1), pp.1-7.

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).

Mbhatsani, H.V., Mabapa, N.S., Ayuk, T.B., Mandiwana, T.C., Mushaphi, L.F., Mohlala, M. and Mbhenyane, X.G. (2021). Food security and related health risk among adults in the Limpopo Province of South Africa. *South African Journal of Science*, 117(11-12), pp.1-7.

Matebeni, F. (2018). *Measuring rural household food security in the Nkonkobe local Municipality, Eastern Cape Province of South Africa* (Masters dissertation, Stellenbosch: Stellenbosch University).

Mathebula, N.E., Nkuna, N.W. and Sebola, M.P. (2016). Integrated Development Plan for improved service delivery: a comparative study of municipalities within the Mopani District Municipality, Limpopo Province. *International Journal of Business and Management Studies*, 8(1), pp.70-85.

Mathias, K.C., Slining, M.M. and Popkin, B.M. (2013). Foods and beverages associated with higher intake of sugar-sweetened beverages. *American journal of preventive medicine*, 44(4), pp.351-357.

Maxwell, D., Caldwell, R. and Langworthy, M. (2008). Measuring food insecurity: can an indicator based on localized coping behaviors be used to compare across contexts? *Food Policy*, 33(6), pp.533-540.

Maxwell, D., Coates, J. and Vaitla, B. (2013). How do different indicators of household food security compare? Empirical evidence from Tigray. *Medford: Tufts University*, 26.

Mopani District Municipality Integrated Development Plan (CDM IDP). (2017).

Available online:

<http://www.mopani.gov.za/docs/idp/Mopani%20IDP%202017%202018%20Version%202.pdf> [Accessed: 22 July 2019]

Mopani District Municipality Integrated Development Plan (CDM IDP). (2017/2018).

Available online:

<http://www.mopani.gov.za/docs/reports/MDM%20Annual%20Report%20.docx%20September%202018%20final.pdf> [Accessed: 10 September 2019]

Mopani District Municipality Integrated Development Plan (CDM IDP). (2018/2019).

Available online:

<http://www.mopani.gov.za/docs/idp/final%20Mopani%202018%202019%20Versions%203.pdf> [Accessed: 7 October 2019]

Morawicki, R.O. and Díaz, G.D.J. (2018). Food sustainability in the context of human behavior. *Yale J. Biol. Med.*, 91, pp. 191–196.

Mturi, A.J., Sekudu, J. and Kweka, O. (2012). Understanding the experiences and challenges of child-headed households and the role of social grants in South Africa. *Journal of Social Development in Africa*, 27(2), p.9.

Mudau, M. and Netshandama, V. (2012). Evaluation of funded income generating projects: a case of government funded agricultural projects in Limpopo. In *A Conference Study presented at the University of Cape Town, South Africa*.

National Department of Agriculture. (1998). Agricultural policy in South Africa. Discussion document, Pretoria.

National Department of Agriculture. (2002). The integrated food security strategy for South Africa.

Ncube, N. and Kang'ethe, S.M. (2015). Pitting the state of food security against some millennium development goals in a few countries of the developing world. *Journal of Human Ecology*, 49(3), pp.293-300.

Ndobo, F.P. (2013). *Determining the food security status of households in a South African township* (Doctoral dissertation, North-West University).

Nesengani, T.J., Mudau, M.J. and Netshandama, V.O. (2016). Verification of the existence of food security projects in Limpopo Province, South Africa. *South African Journal of Agricultural Extension*, 44(2), pp.52-58.

Nesengani, T.V., Downing, C., Poggenpoel, M. and Stein, C. (2019). Professional nurses' experiences of caring for patients in public health clinics in Ekurhuleni, South Africa. *African Journal of Primary Health Care and Family Medicine*, 11(1), pp.1-11.

New Media Holdings. (2015). *The climate of Limpopo Province*. Available online: <http://www.southafrica.com/Limpopo/climate/> [Accessed: 25 March 2020].

Ngema, P.Z., Sibanda, M. and Musemwa, L. (2018). Household food security status and its determinants in Maphumulo local municipality, South Africa. *Sustainability*, 10(9), p.3307.

Nyathela, T. and Oldewage-Theron, W. (2017). Nutritional status and food consumption patterns of primary school children in Orange Farm. *African Journal of Food, Agriculture, Nutrition and Development*, 17(1), pp.11497-11517.

Olowu, D. (2013). Gender aspects of food security in Lesotho: implications for an integrative Rights-Based Approach. Nigeria: Centre for Psychological Studies/Services, Ile-Ife.

Omotayo, A.O. and Aremu, A.O. (2020). Evaluation of factors influencing the inclusion of indigenous plants for food security among rural households in the Northwest Province of South Africa. *Sustainability*, 12(22), pp.9562.

Oslin, C. and George, M.M.M. (2004). *Cross-sectional study design and data analysis: the Young Epidemiology Scholars Program*. Illinois: Walden University-Chicago.

Peng, W. and Berry, E.M. (2018). Global nutrition 1990–2015: a shrinking hungry and expanding fat world. *PloS One*, 13(3), pp.e0194821.

Pinstrup-Andersen, P. (2009). Food security: definition and measurement. *Food Security*, 1(1), pp.5-7.

Prabhat, A. and Begum, K. (2012). Food consumption pattern and nutritional status of women laborers from coastal areas of Karnataka. *National Journal of Community Medicine*, 3(2), pp.321-325.



Riely, F., Mock, N., Cogill, B., Bailey, L. and Kenefick, E. (1999). Food security indicators and framework for use in the monitoring and evaluation of food aid programs. *Nutrition Technical Assistance Project (FANTA), Washington, DC.*

Ronquest-Ross, L.C., Vink, N. and Sigge, G.O. (2015). Food consumption changes in South Africa since 1994. *South African Journal of Science*, 111(9-10), pp.01-12.

Sekhampu, T.J. (2013). Determination of the factors affecting the food security status of households in Bophelong, South Africa. *International Business & Economics Research Journal (IBER)*, 12(5), pp.543-550.

Shaw, D.J. (2007). International Undertaking on World Food Security. In *World Food Security*. Palgrave Macmillan, London. pp. 150-154.

Shisanya, S.O. and Hendriks, S.L. (2011). The contribution of community gardens to food security in the Maphephetheni uplands. *Development Southern Africa*, 28(4), pp.509-526.

Southern African Development Community. (2019). Food security: early warning system. Food and nutrition security update, Gaborone, Botswana.

Statistics South Africa. (2019). Towards measuring the extent of food security in South Africa: An examination of hunger and food adequacy report: 03-00-14. Available online: <http://www.statssa.gov.za/publications/03-00-14/03-00-142017.pdf> [Accessed: 10 December 2020]

Statistics south Africa. (2017). Poverty on the rise in South Africa. Available online: <http://www.statssa.gov.za/?p=10334> [01 June 2020]

Statistics South Africa. (2018). *Overcoming poverty and inequality in South Africa: An assessment of drivers, constraints and opportunities* (No. 124521, pp. 1-148). The World Bank.

Statistics South Africa. (2016). Available online: [http://www.statssa.gov.za/?page\\_id=1854&PPN=Report-00-91-09](http://www.statssa.gov.za/?page_id=1854&PPN=Report-00-91-09) [Accessed: 19 May 2019]

Statistics south Africa. (2014). Formal employment declines in third quarter. Available online: <http://www.statssa.gov.za/?p=3736> [13 March 2019]

Swindale, A. and Bilinsky, P., 2006. Household dietary diversity score (HDDS) for measurement of household food access: indicator guide. *Washington, DC: Food and Nutrition Technical Assistance Project, Academy for Educational Development.*

Tantu, A.T., Gamebo, T.D., Sheno, B.K. and Kabalo, M.Y. (2017). Household food insecurity and associated factors among households in Wolaita Sodo town, 2015. *Agriculture & Food Security*, 6(1), pp.1-8.

Taruvunga, A., Muchenje, V. and Mushunje, A. (2013). Determinants of rural household dietary diversity: The case of Amatole and Nyandeni districts, South Africa. *Int J Dev Sustainability*, 2(4), pp.2233-2247.

Tibesigwa, B. and Visser, M. (2016). Assessing gender inequality in food security among small-holder farm households in urban and rural South Africa. *World Development*, 88, pp.33-49.

Tomayko, E.J., Mosso, K.L., Cronin, K.A., Carmichael, L., Kim, K., Parker, T., Yaroch, A.L. and Adams, A.K. (2017). Household food insecurity and dietary patterns in rural and urban American Indian families with young children. *BMC Public Health*, 17(1), pp.1-10.

Tonukari, N.J. and Omotor, D.G. (2010). Biotechnology and food security in developing countries. Available online: <http://academicjournals.org/bmbr/PDF/Pdf2010/Feb/Tonukari%20and%20Omotor.pdf> [Accessed: 22 July 2020].

United Nation Development Plan. (1994). Human Development Report. Available online: [http://hdr.undp.org/sites/default/files/reports/255/hdr\\_1994\\_en\\_complete\\_nostats.pdf](http://hdr.undp.org/sites/default/files/reports/255/hdr_1994_en_complete_nostats.pdf) [Accessed: 22 April 2019]

Urassa, J.K. (2010). *Rural household livelihoods, crop production and well-being after a period of trade reforms: a case study of Rukwa, Tanzania* (Doctoral dissertation, University of Sussex).

Vink, N. and Van Rooyen, J. (2009). *Perspectives on the performance of agriculture in South Africa since 1994 and implications for its role in achieving sustainable food security* (No. 1737-2016-140352).

Wenhold, F., Annandale, J. and Faber, M. (2012). Research project helping to tackle malnutrition in South Africa: food security. *Water Wheel*, 11(2), pp.30-31.

World Bank (2001). Nuts and bolts. Available online: <http://wbinoo18worldbank.org/rdv/food.nsf> [Accessed:06 August 2019]

World Bank. (2010). World Development Report: development and climate change. Washington, DC. World Bank. Available online: <https://openknowledge.worldbank.org/handle/10986/4387> [Accessed: 09 November 2019]

World bank. (2020). Food security and COVID-19. Available online: <https://www.worldbank.org/en/topic/agriculture/brief/food-security-and-covid-19> [Accessed:19 October 2020]

World Health Organization. (2018). *The state of food security and nutrition in the world 2018: building climate resilience for food security and nutrition*. Food & Agriculture Org.

Zhou, D., Shah, T., Ali, S., Ahmad, W., Din, I.U. and Ilyas, A. (2019). Factors affecting household food security in rural northern hinterland of Pakistan. *Journal of the Saudi Society of Agricultural Sciences*, 18(2), pp.201-210.

## APPENDIX A: Consent form



### SCHOOL OF AGRICULTURAL AND ENVIRONMENTAL SCIENCES

Department: Agricultural Economics and Animal Production

#### CONSENT FORM

**TITLE OF RESEARCH PROJECT: Analyzing food security among Rural Households of Capricorn and Mopani Districts, Limpopo Province, South Africa**

**Dear Participant**

The aim of this study is to analyse food security using food availability, access, utilisation and stability approach among rural households of Capricorn and Mopani Districts in the Limpopo Province, South Africa.

Kindly be informed that, your participation in the study is voluntary. You have the right to be a part of the study, to choose not to participate or to stop participating at any time without penalty. The responses given during this research will be treated as confidential information and the information obtained will be used for the purposes of this research only.

There are no direct benefits from participating in the study, however, the study can only provide gathered information pertaining to the aim of the study given above.

For any enquiries concerning the study, you may contact the researcher via email at [nengovhelarudzani90@gmail.com](mailto:nengovhelarudzani90@gmail.com) or the Supervisor at [abenet.belete@ul.ac.za](mailto:abenet.belete@ul.ac.za)

#### CONSENT

I have read and understood the above information relating to the research and I am willing to participate in the study.

Signature of

participant.....Date.....

**WITNESS**.....

## APPENDIX B: Household Questionnaire



### SECTION A: PREAMBLE

DEAR RESPONDENT,

I am a PhD student in the Department of Agricultural Economics and Animal Production at the University of Limpopo. Currently, I am conducting research on analysis of food security among rural households in the Capricorn and Mopani Districts of the Limpopo Province, South Africa. It will be greatly appreciated if you would kindly complete the following questionnaire. The information that you provide will be used to make recommendations to the policy makers. I promise that the information will be treated with the strictest confidence. Also, to protect your identity, your name will not be required. Thank you in advance.

Yours faithfully,

Nengovhela Rudzani

Contact details:

E-mail: [nengovhelarudani90@gmail.com](mailto:nengovhelarudani90@gmail.com)

Cell phone number: +27 76 614 6355

**Name of Enumerator**.....

**District and local municipality**.....

## SECTION B: DEMOGRAPHIC INFORMATION

Please fill in the following information by marking with an X in the appropriate box.

1. Gender:	Male		Female	
------------	------	--	--------	--

2. Age of a household head	
----------------------------	--

3. Household size	
-------------------	--

4. Marital status:

Single		Married		Widowed		Divorced	
--------	--	---------	--	---------	--	----------	--

5. Level of education (tick the correct box)

Never went to school	
Primary school	
Secondary school	
Tertiary school	
Abet education	

6. Employment status

Employed	
Unemployed	

7. What is your total household income per month?

Over R1000		R1099- R1999		R2000- R2999		R3000- R3999		R4000- R4999		Over R5000	
------------	--	--------------	--	--------------	--	--------------	--	--------------	--	------------	--

8. What are your sources of income?	
Wages	
Salary	
Old Age Pension	
Child Grant	

Other grants from the government	
----------------------------------	--

9. Remittances	yes		No	
----------------	-----	--	----	--

10. Access to credit for borrowing money	yes		No	
--	-----	--	----	--

11. Where do you get the credit from .....

12. How many livestock do you own (number).....

13. What is your farm size (hectares).....

### SECTION C: FOOD CONSUMPTION PATTERNS

Food groups or types	Consumption status		Consumption frequency		
	Yes	No	Daily	Weekly	Monthly
Any bread, rice, or any other foods made from millet, sorghum, maize, wheat, or any other locally available grain					
Any potatoes, yams, cassava, or any other foods made from roots or tubers					
Any vegetables					
Any fruits					
Any beef, pork, lamb, rabbit, chicken, duck, other birds and organ meats					
Any eggs					
Any fresh or dried fish or shellfish					
Any food made from beans, peas and lentils					
Any yoghurt, milk, or milk products					
Any food made with oil, fat or butter					
Any sugar					



## SECTION D: FOOD SECURITY

### 1. AVAILABILITY

1. Do you have access to arable land?	Yes	No
---------------------------------------	-----	----

2. Do you use the arable land for crop production?	Yes	No
--	-----	----

3. Do you have access to water?	Yes	No
---------------------------------	-----	----

4. Have you experienced drought during any production period?	Yes	No
---	-----	----

5. Do you have sufficient money to buy food	Yes	No
---	-----	----

6. Distance to the food market.....

### 2. ACCESS: (HOUSEHOLD FOOD INSECURITY ACCESS SCALE)

Questions	Response options	Code
1. Did you worry that your household would not have enough food?	0= No (skip to Q2) 1= Yes	
1(a). How often did this happen?	1= Rarely (once or twice in the past 30 days) 2= Sometimes (three to ten times in the past 30 days) 3= Often (more than 10 times in the past 30 days).	
2. Were you or any household member not able to eat the kinds of foods you preferred	0= No (skip to Q3) 1= Yes	

because of a lack of resources?		
2(a). How often did this happen?	1= Rarely (once or twice in the past 30 days) 2= Sometimes (three to ten times in the past 30 days) 3= Often (more than 10 times in the past 30 days).	
3. Did you or any household member have to eat limited variety of foods due to lack of resources?	0= No (skip to Q4) 1= Yes	
3(a). How often did this happen?	1= Rarely (once or twice in the past 30 days) 2= Sometimes (three to ten times in the past 30 days) 3= Often (more than 10 times in the past 30 days).	
4. Did you or any other household member eat some foods that you really do not want to eat because of lack of resources to obtain other types of food?	0= No (skip to Q5) 1= Yes	
4(a). How often did this happen?	1= Rarely (once or twice in the past 30 days) 2= Sometimes (three to ten times in the past 30 days) 3= Often (more than 10 times in the past 30 days).	
5. Did you or any household member have to eat a smaller meal than you felt you needed because there was not enough food?	0= No (skip to Q6) 1= Yes	
5(a). How often did this happen?	1= Rarely (once or twice in the past 30 days) 2= Sometimes (three to ten times in the past 30 days)	

	3= Often (more than 10 times in the past 30 days).	
6. Did you or any household member have to eat fewer meals in a day because there was not enough food?	0= No (skip to Q7) 1= Yes	
6(a). How often did this happen?	1= Rarely (once or twice in the past 30 days) 2= Sometimes (three to ten times in the past 30 days) 3= Often (more than 10 times in the past 30 days).	
7. Was there ever no food at all in your household because there were not resources to get more food?	0= No (skip to Q8) 1= Yes	
7(a). How often did this happen?	1= Rarely (once or twice in the past 30 days) 2= Sometimes (three to ten times in the past 30 days) 3= Often (more than 10 times in the past 30 days).	
8. Did you or any household member go to sleep at night hungry because there was not enough food?	0= No (skip to Q9) 1= Yes	
8(a). How often did this happen?	1= Rarely (once or twice in the past 30 days) 2= Sometimes (three to ten times in the past 30 days) 3= Often (more than 10 times in the past 30 days).	
9. Did you or any household member go a whole day without eating anything because there was not enough food?	0= No (questionnaire is finished) 1= Yes	

9(a). How often did this happen?	1= Rarely (once or twice in the past 30 days) 2= Sometimes (three to ten times in the past 30 days) 3= Often (more than 10 times in the past 30 days).	
----------------------------------	--	--

**3. UTILISATION: RECALL OF ALL FOOD GROUPS EATEN AND BEVERAGES DRUNK IN THE PAST 7 DAYS**

Food groups	Points
1. Any bread, rice, or any other foods made from millet, sorghum, maize, wheat or any other locally available grain	
2. Any potatoes, yams, cassava or any other foods made from roots or tubers	
3. Any vegetables	
4. Any fruits	
5. Any beef, pork, lamb, rabbit, chicken, duck, other birds and organ meats	
Any eggs	
6. Any fresh or dried fish or shellfish	
7. Any food made from beans, peas and lentils	
8. Any yoghurt, milk, or milk products	
9. Any food made with oil, fat or butter	
10. Any sugar	
11. Any food such as coffee or tea	

**Key:** if the answer is yes award 1 point and if the answer is no award 0 points

**4. STABILITY**

Please indicate the extent to which you agree or disagree with the following statements by marking with an X in the appropriate box.

1. Do you always have access to sufficient food?

Strongly disagree		Disagree		I do not know		Agree		Strongly agree	
-------------------	--	----------	--	---------------	--	-------	--	----------------	--

2. Have you ever experienced a temporal or permanent loss of access to the resources needed to consume adequate food?

Strongly disagree		Disagree		I do not know		Agree		Strongly agree	
-------------------	--	----------	--	---------------	--	-------	--	----------------	--

3. Do you sometimes run out of food?

Strongly disagree		Disagree		I do not know		Agree		Strongly agree	
-------------------	--	----------	--	---------------	--	-------	--	----------------	--

4. Is climate variability an important cause of unstable access to food?

Strongly disagree		Disagree		I do not know		Agree		Strongly agree	
-------------------	--	----------	--	---------------	--	-------	--	----------------	--

5. Have you ever experienced not having food for more than a month?

Strongly disagree		Disagree		I do not know		Agree		Strongly agree	
-------------------	--	----------	--	---------------	--	-------	--	----------------	--

## SECTION E: FARMING SYSTEM

1. Which type of farming are you involved in?	Crop production	Livestock Production	Mixed farming

2. Which animals do you have and how many?

Animal	Mark with an X	Number of animals
Cattle		
Goats		
Sheep		
Pigs		
Ducks		

Horses		
Other (specify)		

3. Do you have a garden in your residential area?	Yes	No
---	-----	----

4. Do you cultivate on the garden area?	Yes	No
---	-----	----

5. Where do you get money to invest on farming?	Banks	Friends	Own savings	State Aid	Loan sharks	Other (Specify)

6. Which crops did you grow, in the last season?

Crops grown	Mark with an X	
Ht Maize	Bt Maize	Spinach
Cabbage	Potatoes	Pumpkins
Butternut	Beetroot	Onions
Other (Specify)		

7. Which production assets do you have?	Tractor	Animal traction	Hand tool	Storage facilities	Land	Other(specify)

8. what are your sources of labour.....?

9. Do you improve soil fertility?	Yes	No
10. Have you received any training on how and when to apply fertilizer?	Yes	No
11. Is there anyone in your household who has received training on agriculture, general?	Yes	No

12. Where do you sell your produce?.....

**SECTION F:**

**TECHNICAL FACTORS**

1. Do you have access to advanced equipment	Yes	No
---	-----	----

2. Please indicate the advanced equipment you have access to

Equipment	Please mark with X
Borehole and borehole pumps	
Tractor	
Water storage tanks	
Harvesters	
Sprinklers	
Other (specify)	

3. Where do you store your produce after harvesting?.....

4. What are the road conditions in your village?

Poor	Good	Other (specify)
------	------	-----------------

5. Do you have access to transport?	Yes	No
-------------------------------------	-----	----

## INSTITUTIONAL FACTORS

1. Do you receive assistance from extension officers	Yes	No
--	-----	----

2. How do you rate the services offered by extension officers?

Poor	Good	Excellent
------	------	-----------

## Markets

1. Do you participate in	None	informal markets	Formal market	Use produce for home consumption
--------------------------	------	------------------	---------------	----------------------------------

2. How do you market your products?

Social networks	Media	Neighbours	Other (specify)
-----------------	-------	------------	-----------------

3. Do you always find markets for all your produce?	Yes	No
---	-----	----

4. If no what happens to the unsold produce?

Sell at lower price	Consumed by family	Store and sell it later	Other(specify)
---------------------	--------------------	-------------------------	----------------

## SECTION G: COPING STRATEGIES IN THE PAST 30 DAYS

1. Did you borrow food from relatives/friend/neighbours?	yes		No	
--	-----	--	----	--

2. Did you reduce food intake?	yes		No	
--------------------------------	-----	--	----	--

3. Did you buy food on credit?	yes		No	
--------------------------------	-----	--	----	--



4. Did you sell household assets?	yes		No	
5. Did you sell livestock?	yes		No	
6. Did you limit or reduce portion size?	yes		No	
7. Did you borrow money from money lenders?	yes		No	
8. Did you skip meals for the entire day?	yes		No	
9. Did you eat at religious places?	yes		No	
10. Did you send household members to eat elsewhere?	yes		No	
11. Did you send household members to go beg?	yes		No	
12. Did you receive food parcels?	yes		No	

**THANK YOUR PARTICIPATION!!!!!!!!!!!!!!**

## APPENDIX C: Ethical Clearance Certificate



### University of Limpopo

Department of Research Administration and  
Development  
Private Bag X1106, Sovenga, 0727, South Africa  
Tel: (015) 268 3935, Fax: (015) 268 2306, Email:  
anastasia.ngobe@ul.ac.za

#### TURFLOOP RESEARCH ETHICS COMMITTEE

#### ETHICS CLEARANCE CERTIFICATE

**MEETING:** 24 April 2020  
**PROJECT NUMBER:** TREC/65/2020:PG  
**PROJECT:**

**Title:** Analysing Food Security Among Rural Households of  
Capricorn and Mopani Districts, Limpopo Province,  
South Africa

**Researcher:** R Nengovhela

**Supervisor:** Prof A Belete

**Co-Supervisor/s:** Dr JJ Hlongwane

Prof IB Oluwatayo

**School:** Agricultural and Environmental Sciences

**Degree:** PhD in Agricultural Economics

*Finding solutions for Africa*



**PROF P MASOKO**

**CHAIRPERSON: TURFLOOP RESEARCH ETHICS COMMITTEE**

The Turfloop Research Ethics Committee (TREC) is registered with the National Health Research Ethics Council, Registration Number: **REC-0310111-031**

**Note:**

- i) This Ethics Clearance Certificate will be valid for one (1) year, as from the abovementioned date. Application for annual renewal (or annual review) need to be received by TREC one month before lapse of this period.**
- ii) Should any departure be contemplated from the research procedure as approved, the researcher(s) must re-submit the protocol to the committee, together with the Application for Amendment form.**
- iii) PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES.**

## APPENDIX D: Editorial Letter

# UNIVERSITY OF LIMPOPO TURFLOOP CAMPUS

Faculty: Humanities  
School: Languages and Communication Studies  
Department: Languages



Private Bag X1106  
Sovenga  
0727  
Tel: +27 15 268 3564  
Cell: 073 597 4602/076 4983 344/0605484820  
E-Mail: [moffat.sebola@ul.ac.za](mailto:moffat.sebola@ul.ac.za)

06 October 2021

### TO WHOM IT MAY CONCERN

This letter serves to certify that I have edited a doctoral thesis entitled: **ANALYSING FOOD SECURITY AMONG RURAL HOUSEHOLDS OF CAPRICORN AND MOPANI DISTRICTS, LIMPOPO PROVINCE, SOUTH AFRICA** by **Rudzani Nengovhela**.

I trust you will find the editing quality in order.

Best regards

*Sebola, M*

---

**MOFFAT SEBOLA**