UNDERSTANDING FACTORS CONTRIBUTING TO HOUSEHOLD FOOD

INSECURITY AND POVERTY DYNAMICS IN GERT SIBANDE DISTRICT

MPUMALANGA PROVINCE OF SOUTH AFRICA

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by

Agboola Peter Temitope

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DEDICATION

I dedicate this master thesis to my wife Agboola Olabisi Dorcas, and my children. My heartfelt gratitude to my wife for her patience and understanding despite battling with COVID-19 all the time. I was not available to be with them due to a busy schedule for my academic pursuit.

ABSTRACT

Agboola, Peter Temitope, *Understanding factors contributing to household food insecurity and poverty dynamics in Gert Sibande District Mpumalanga Province of South Africa*. Master of Science (Agriculture), August, 2021, Sam Houston State University, Huntsville, Texas.

The challenges posed by the risk of food insecurity, poverty, and hunger have been a major concern in many households in Sub-Saharan Africa and the world at large. This concern is attributable to the negative impacts of the ongoing COVID-19 pandemic, which has led to an increment in food prices and food shortages within South Africa. This study has evaluated the factors contributing to farming households' food insecurity and poverty in Gert Sibande Municipality of Mpumalanga Province of South Africa.

The study was restricted only to two local municipalities out of seven municipalities in Gert Sibande district. A structured questionnaire was administered for data collection. A total of 383 households were involved in the study. Within each municipality, several villages were selected for the survey through the probability random sampling technique. Data were collected between the 23rd of November 2020 and the 25th of January 2021. All responses from the questionnaires were tabulated and processed using Microsoft Excel, Statistical Package for Social Sciences (SPSS) program, and STATA.

The Household Food Insecurity Assessment Scale (HFIAS) and Foster-Greer-Thorbecke (FGT) indices were calculated to gauge the households' food insecurity and poverty status. The HFIAS category indicated that 34.46%, 4.18%, 40.47%, and 20.89% of the households were food secure, mildly, moderately, and severely food insecure, respectively. The FGT poverty index showed that 32.64% of the households were poor while the remainder (67.36%) were categorized as non-poor households.

The study applied two regression models: an OLS regression and a logistics regression to identify factors influencing farming households' food insecurity and poverty status. Factors such as electricity as the cooking energy, growing cereals, being employed, and employment income were negatively associated with food insecurity, whereas housing ownership and access to government child support were positively associated with food insecurity. While household size was positively associated with being poor, employment income, access to social grant, and receipt of remittance were negatively associated with households' poverty status in the study area.

Policy recommendations are made on encouraging younger people to engage in agriculture due to the ageing of farming households. Promoting education and enhancing the standard of education by the government through extension agents could increase the employability of the household heads, thus contributing to improved income for the households. As a larger household size is associated with a higher probability of being poor, endorsing family planning methods for farming households might be needed. Securing multiple sources of livelihood, including both on-farm and off-farm activities, could potentially lead to higher income for the farming households.

KEY WORDS: Household food insecurity, Poverty, COVID-19, Gert Sibande, Mpumalanga Province, South Africa.

ACKNOWLEDGEMENTS

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CHAPTER I

Introduction

Background

Intense hunger and poverty are ravaging many African homes today, with about 3

billion individuals living under chronic poverty globally (Macrotrends, 2020). The

anguish of poverty is the major problem that many developing countries are facing, with

about one-quarter of the population of the African continent suffering from severe hunger

(FAO, 2016). Therefore, the rising level of food insecurity in Africa has been a major

concern for policymakers (Pérez-Escamilla et al, 2017). This is no exception to a nation

like the Republic of South Africa. According to Statistics SA (2019), almost half of the

adult population in South Africa are food insecure and live in poverty, with the majority

of the adult female mostly affected.

Due to the impact of the COVID-19 pandemic, rising food prices have

exacerbated the situation in South Africa, with about 40% of the populace living in

extreme poverty (Omotayo & Aremu, 2020; Omotayo et al., 2021). The economic

disruption caused by the pandemic has aggravated the level of poverty within the country,

leaving millions of people vulnerable to extreme hunger and food insecurity within the

nation (Omotayo et al., 2021). In addition, the pandemic has exposed many households to

severe hunger and poverty caused by various socio-economic factors such as increased

rate of unemployment, lack of access to a nutritious diet, loss of income, and lack

of access to basic health care (Omotayo & Aremu, 2020).

The Food and Agricultural Organization of the United Nations define food

security as a circumstance that exists when "all people, at all times, have physical, social,

and economic access to sufficient, safe, and nutritious food that meets their food preferences and dietary needs for an active and healthy life" (FAO, 2008). Embedded in this definition are four crucial food supply components: food accessibility, food availability, food utilization, and food stabilization. When any of these factors are not met or uncertain, the food system tends to be vulnerable and insecure (FAO, 2008). However, these four crucial factors remain unachievable for the South African government now.

Nevertheless, South Africa continues to grapple with its persistent trend of food insecurity ravaging millions of its populaces over the years. According to the South African government, food security is achieved when people have easy access to nutritious and sufficient food to live a healthy lifestyle (Labadarios et al., 2011). With this definition, food security is simply about the quality of diet and people's ability to access food to meet their daily dietary needs. These still depend on the four crucial pillars, including accessibility, availability, utilization, and stability. This has been very difficult to derive despite the focus and policies of achieving food security and eradicating poverty.

South Africa has been considered the second-largest economy in Africa with a robust and consistent economy (World Bank, 2017). Even though the nation was declared food secured at the national level, most of the rural households in the country are still food insecure, with the vast majority of the populace not having access to sufficient food (Statistics SA, 2017). Hence, to have a broadened understanding and identify the food security status of the country, numerous studies must be carried out illustrating challenges in distributional problems and how households access food. These accessibility and distributional problems need to be addressed before an ending solution can be found.

According to the World Bank (2017) more than half of South Africa is urbanized, with most residents accessing food through the market and not production (SACN, 2015). To have access to sufficient food, a good food distributional system needs to be structured that is responsive to meet the needs of its resident at a low cost. At present, households spend more on food expenditure at the market to meet their dietary needs. Therefore, households' income should be enhanced by expanding employment opportunities which will bring about a lasting solution to poverty and food insecurity.

Mpumalanga Province is one of the most prominent provinces in South Africa. It has been characterized as one of the stable economic resource provinces in the country, with most of the population living in rural areas. Most of the inhabitants are rendered jobless due to the increasing rate of unemployment in the province, which made a significant number of locals depend on subsistence agriculture and mining for survival. The province is ravaged by a high rate of poverty, with about 42% of the populace living below the estimated national poverty level (Alexander, 2018). Lack of basic amenities such as infrastructure, health care amenities, employment, housing, and sanitation all exerts adverse effects on households (Walters, 2008).

Problem Statement

Food insecurity and poverty have emerged as a global crisis following the global economic meltdown as well as the ongoing Covid -19 pandemic. According to the 2004 report of the Food and Agriculture Organization (FAO) on the state of food insecurity in the world, more than 814 million people in developing countries are undernourished. Out of these people, 204 million live in countries of sub-Saharan Africa, including South Africa (Labadarios et al., 2011).

Despite the political and economic advances seen in South Africa since 1994, the country is plagued by poverty, food insecurity, and unemployment following the recent global Covid-19 pandemic. It is also facing steep food and fuel prices, high-energy tariffs, and increasing interest rates. These adverse conditions have placed severe pressure on ordinary South Africans already struggling to meet their basic household needs. Thus, it is urgent to use suitable measures to assess the current food insecurity and poverty status in the context of rural South Africa.

According to Davids (2006), after decades of democracy, a large proportion of South Africans still perceive themselves as lacking enough income to meet all their household needs, especially in the rural settings of the nation. Millions of dollars are spent annually on food aid programs intended to alleviate hunger and poverty. For these programs to work effectively, households at the greatest risk of food insecurity have to be identified by means of an objective and accurate indicator of food insecurity and poverty at the household's level. The Household Food Insecurity Assessment Scale (HFIAS) scores and Foster-Greer-Thorbecke (FGT) indices are among the measures developed for this purpose and utilized in this study.

Due to the scarcity of work on food security and poverty in rural South Africa, this study seeks to probe the subject matter in the rural Mpumalanga province of South Africa. Until now, there is no national survey conducted to assess all the rural food insecurity and poverty in South Africa, although some national surveys have included specific components of food insecurity as well as the general food security level of the nation. Thus, the objective of the current research is highlighted in the following research questions section.

Motivation for the Study

The adverse effect of Covid-19 pandemic has exposed many homes to economic hardship and threatened food security globally. South Africa is no exception, with food insecurity and poverty at its highest level ever due to economic decline. Increment in food prices, food shortage, and other socio-economic disasters have been experienced from the start of the pandemic. The principal motivation behind this study is to evaluate the factors contributing to farming households' food insecurity and poverty in Gert Sibande Municipality of Mpumalanga Province of South Africa. Only a few empirical works exist in the literature that investigates the food security and poverty among farming households in Gert Sibande Municipality of Mpumalanga Province South Africa in recent times. These existing works of literature were at most with partial treatment of these concepts. The study will further understand how food insecurity and poverty are evaluated and measured in the study area.

Research Questions

The study will attempt to provide adequate answers to the following key research questions:

1. What is the current state of food insecurity in rural households in the study area?

2. What are the main sources of cash income in the rural household in the study area?

3. Who are the food insecure in the rural household in the study area?

4. What are the main causes of poverty in the study area?

5. What are the key factors affecting food insecurity among households in Mpumalanga Province?

Research Objectives

This research aims to understand factors contributing to food insecurity and poverty status among rural farming households in Gert Sibanda district of Mpumalanga Province, South Africa.

The specific objectives of the study are to:

1. Describe the farming typology and socio-economic characteristics of rural farming households in the study area.

2. Identify the main income source of rural households participating in the study.

3. Analyze the effect of households' socioeconomic characteristics on their food insecurity status.

4. Investigate the fundamental causes of poverty.

Benefits of the Study

The objectives above are expected to lead to the following benefits:

1. To give up-to-date detailed information on food insecurity status of farming households in Mpumalanga Province.

2. To show income distribution sources in Mpumalanga Province.

3. To explore the rate of poverty and other factors contributing to the poverty status of farming households in the province.

CHAPTER II

Theoretical Framework And Literature Review

Food Security Concept

The model of food security is a comprehensive assessment that is a little complex to understand. Many definitions of food security emerged in the late 1990s, but the concept of food security originated in 1970 during a time of global food shortage (Maxwell, 1996). Food security was mainly defined and instituted on food availability and food supply both at local and international levels. In 1974, food security was described at the World Food Summit as the process that can sustain food consumption, expansion, reduced fluctuation in price, and production of basic world foodstuff through constant supply of food to the people (United Nations, 1975).

The Food and Agricultural Organization of the United Nations later broadened this definition as a circumstance that exists when "all people, at all times, have physical, social, and economic access to sufficient, safe, and nutritious food that meets their food preferences and dietary needs for an active and healthy life" (FAO, 2008). Four key factors of food supply were mentioned in this definition: accessibility, availability, utilization, and stability. When any of these factors are uncertain, the food system is vulnerable and insecure (FAO, 2008).

Food Availability

Food availability in adequate quantity and good quality are some of the ways to attain food security, such that foodstuff can be obtained from different channels, such as food assistance, household production, commercial import, or other domestic output

(United State Development Agency, 2006). Young (2004) argued that food security could not be attained by a one-dimensional and production-orientated approach, either at the national or household level, because the green revolution did not reduce malnutrition by increasing food production. (Sen, 1981) mentioned in his entitlement concept that the inability of people to secure food is the reason for hunger and not the lack of food; therefore, though food availability is vital, it is not the only aspect needed to address food security problems.

Food Accessibility

Food accessibility is established when household members are entitled to adequate and appropriate, balanced nutritious diet, which is equally safe for consumption; food can either be obtained as gifts, grants, or market transfer. Nonetheless, food accessibility is influenced by household income and distribution, as well as food prices. Thus, this is an indication that for all households to achieve food security, they ought to have sufficient resources to purchase adequate amounts of food for the family. Meanwhile, entitlement or income does not equate to food security because households may have the same income and entitlement but differ in the kind of foodstuff they purchase. Additionally, the magnitude of their earnings spent on food purchases would make a difference in their household food security levels; hence, the necessity for households to socially acquire their preferred foodstuffs in an acceptable manner. Therefore, the two major factors needed to determine food accessibility are food availability and the capacity to access food. Accordingly, the several choices people make, cultural background, including how and what they eat, are vital to understanding the concept of food security.

Food Utilization

Food utilization relates to the ability of the household or individual to make effective use of the food that is acquired. Alongside this, some important factors should be noted: food storage, preservation, preparation, and consumption. Devereux and Maxwell (2001) also urged that the processes food undergo, such as selection, distribution, storage, preparation, and consumption, consequently affect the nutrient absorption of the food. While FAO (2016) further explains that the different reasons for utilizing food are beyond quantity and necessary diet, but also inclusive are adequate food nutrient absorption and utilization.

Nutrient absorption is inclined by sustenance, clean water, hygiene, health education, and health maintenance amenities. As such, to ensure optimal food utilization, education on nutrition and health care should be invested into (Boadi et al., 2005). Knowledge about food storage and processing techniques among households would boost food nutrient absorption and utilization. Withal, there are usually high rates of disease in most developing countries with poor sanitation, limited safe water, and poor storage equipment, which affects food security and utilization, according to the findings of Boadi et al. (2005).

Food Stability

The fourth pillar of the food security concept is stability, and it is the ability to maintain food security over a specific timeframe. However, the stability level of food secured households may be affected by periodical and cyclical shocks. These shocks include unexpected job loss by household members, and food regularity may influence sustenance access. Webb and Rogers (2003) summarized the four components of food

security through a conceptual framework. Food availability is a necessary but not sufficient condition for food access. Subsequently, food accessibility is a necessary but not sufficient condition for food utilization. Meanwhile, food availability, access, and utilization may be affected by some risk factors, including natural shocks, economic risks, and social and health risks (Webb & Rogers, 2003). The ongoing COVID-19 pandemic is an example of a health risk factor.

Consequently, to attain food security, foodstuff should be available, accessible, and properly utilized. While food availability is influenced by labor, natural resource, productive assets, and secured livelihoods, sufficient accessibility of food is also influenced by income, savings, or credit access.

Food Security Status in South Africa

South Africa is widely known to be a food-secured country due to its capacity to import food, coupled with the ability to produce sufficient staple food locally, which is the basic requirement of its population (FAO, 2008). This was further supported by some researchers who stated that food security is met at the national level in South Africa, but the majority of the households in the rural areas are still food insecure (Hart et al., 2011).

Meanwhile, the General Household Survey (2009) estimates that 20% of South African households have insufficient access to food. The General Household Survey (GHS) in 2008 reported that Free State households had the highest inadequate food access at 33.5%, followed sequentially by Kwazulu Natal (23%), Eastern Cape (21.4%), Mpumalanga (21.5%), Limpopo (11.9%), and Western Cape (14.5%). Correspondingly, several issues that contribute to food insecurity in South Africa are high rates of unemployment, deprived social welfare, and an increasing rate of HIV/AIDS (FAO,

2008). Even Landman (2004) points out that after fifteen years of democracy, food insecurity is still a continuous trend that persists in the country. Equally, Statistics South Africa estimated a 1.7% rise in population per annum and had an assessed population of 49 million in 2009 (Stats SA, 2009). However, the National food security report showed that over the previous years, South Africa had possessed the capacity to meet the food needs of its population.

As stated by Demetre et al. (2004), more than 14 million people in the country or around 35% of the populace are assessed to be susceptible to food insecurity. It was also discovered that about 1.5 million children under the age of six are stunted. Thus, it is obvious that food insecurity in rural areas is growing more intense, with almost 75% of chronically poor people.

Household Food Security Targets and Measurement

Household food security is complex in nature with broad perception and difficult to measure (Hart et al, 2011). Anderson (1990) argues that national food security and household food security are sometimes mixed up. Household food accessibility relies on how food is distributed in the market rather than the total agro-food produced, while business imports are utilized to evaluate food security at the national level. According to Jacobs (2009), the objectives of food security greatly depend on food insecurity measurement and indicator. Given this fact, three groups of food security pointers occur with their distinct qualities and constraints.

Firstly, food availability measurement pays little attention to individual nutritional status but concentrates more on the national food supply. Secondly, food expenditure and access indicators measure disregard individual nutritional status but

concentrate on the financial worth of food as a substitute for food utilization. Thirdly, composite indexes might have misrepresented weights attached to components of the index valves in practice than incorporating all the available dimensions of food security into a single index.

Notwithstanding these security pointers, the lack of precise and acknowledged ways of measuring food security in South Africa is not yet discovered, and no regularized methods of checking have been put in place (Aliber & Hart, 2009). Policy makers' capacity to recognize ways that are suitable for various circumstances is limited. This shows the feeble connection between the government, the private sector, and the civic society.

In South Africa, diverse measurements have been used by researchers. National Food Consumption Survey (NFCS), Food Insecurity and Vulnerability Information and Mapping System (FIVIMS), General Household Survey (GHS), Income and expenditure Survey (IES), Community Survey (CS), and South African Social Attitudes Survey (SASAS) have been used to measure food security status of households. Due to the multifaceted nature of food security, numerous techniques yield diverse results. The GHS, IES, LFS, and Community Survey are all applied by Statistics South Africa, all working in line with the South African government formulation policy.

CHAPTER III

Research Methodology

Introduction

This chapter presents the methods that were used for data collection and analyses. The study focused on Gert Sibanda District Municipality in Mpumalanga Province. The chapter displays the research instrument used for the survey, sampling techniques and procedures, the schematic flow of work of the survey, and the full structure of how data were analyzed.

Study Area

The study area for this research is Gertz Sibande District Municipality of Mpumalanga province in South Africa. The district was named after Richard Gert Sibande, a political African National Congress (ANC) activist. The Gert Sibande District Municipality is one of the district municipalities located in the Mpumalanga Province. The district was chosen for the survey because it is the largest of the three districts in the province, making up almost half of the geographical area of Mpumalanga province. It is comprised of seven local municipalities: Govan Mbeki, Chief Albert Luthuli, Msukaligwa, Dipaleseng, Mkhondo, Lekwa, and Pixley ka Isaka Seme. Most of the district is mostly rural, with more than half of the population living in the rural areas. The district's major economic activities include agriculture, mining, and tourism. The main economic sectors of Gertz Sibande District Municipalities are Manufacturing (49.4%), agriculture (38.1%), transport (31.4%), trade (29.2%), community services (26.9%),

construction (26.6%), electricity (26.1%), finance (23.8%) and mining (23.3%)

(https://municipalities.co.za/overview/132/gert-sibande-district-municipality).

Figure 1

 Map of Gert Sibande Municipality Mpumalanga Province
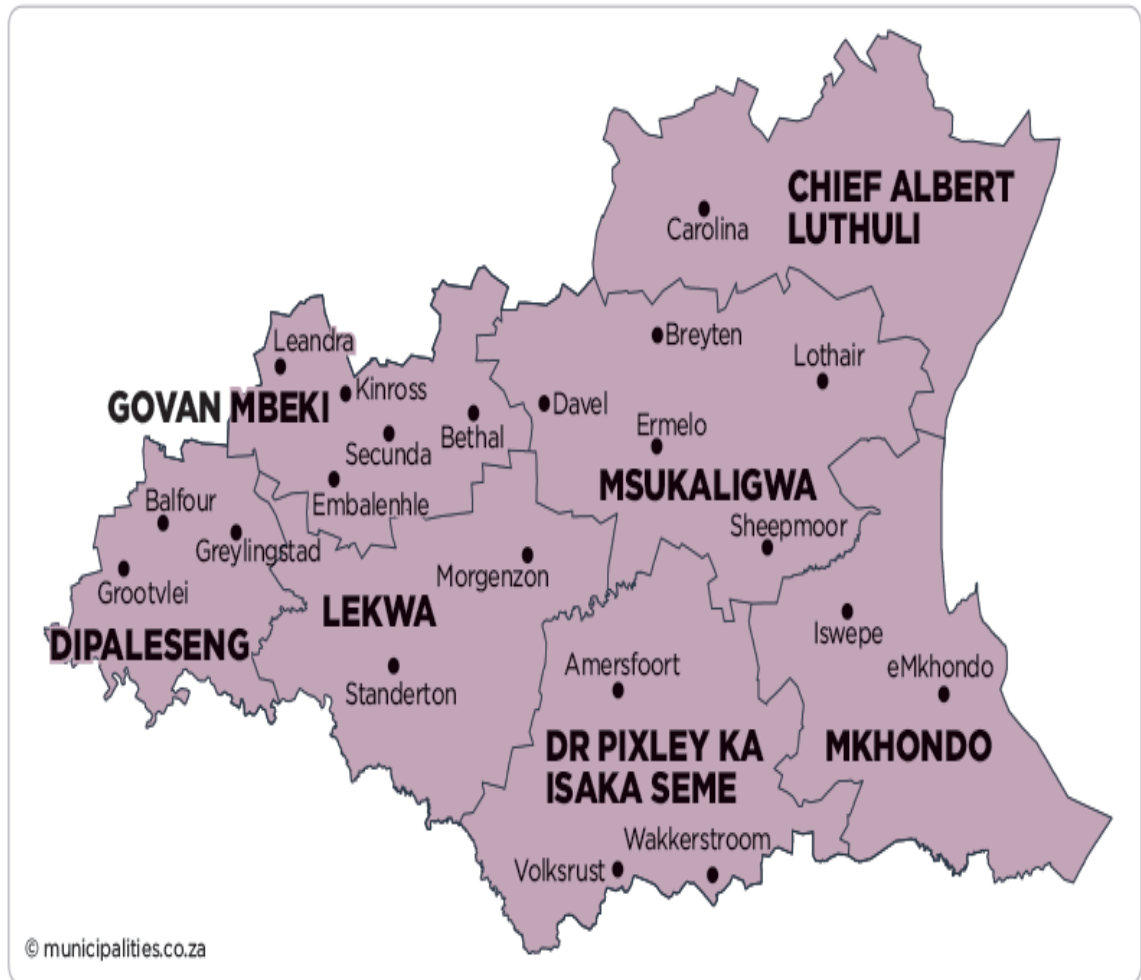
Data Collection Design

A quantitative research design was used for the study. Permission to conduct

research in the study area was first obtained from the Gert Sibande District Municipal,

followed by the approval from the Institutional Review Board (IRB) at Sam Houston

State University to comply with all human subject research regulations and ethical approach. Furthermore, questionnaires were explained to the district director of the department of agriculture and land reform and local councilors of the municipality before carrying out the survey.

Data Collection Instrument

Primary data were collected face-to-face with the use of a questionnaire. A comprehensive, structured household questionnaire was administered as the research data collection instrument. Participants were assured of the anonymity of their responses which was used solely for research purposes. This instrument was selected because of its low cost, and it requires little expertise to run. The questionnaires were divided into different sections to collect information. The sections include household socio-demographic information, housing and facilities, farm structure, households' main livelihood activities, food access, and consumption pattern.

Sample Size and Procedure

A total of 383 questionnaires were administered in the two municipal areas (See Figure 2). Govan Mbeki municipality consists of a population of 294,538 (99.68 per km²) and 83,874 households' (28.39 per km²), while Albert Luthuli comprises a population of 186,010 (33.46 per km²) and 47,705 households (8.58 per km²) (STAT SA, 2011). The research was conducted within 20 villages in the two municipal areas: Bethel, Embalenhle, Trichardt, Secunda, Leslie, eMzinoni, Kinross, Lebogang, Charl Cilliers, Leandra, Bhevula, Eerstehoek, Embhuleni, Enikakuyengwa, Mpisikazi, Tshabalala, Lukwatini, Mpuluzi, Silobela, Emjindini. The selection occurs through probability random sampling technique. The chart below shows the sequence of local municipalities

and how the sample survey took place (Figure 2). The sample survey was obtained from the 23rd of November 2020 to the 25th of January 2021. The sample size was determined using (Krejcie & Morgan, 1970) sampling formula:

$$S = \frac{X^2 NP\ (1-P)}{d^2\ (N-1) + X^2 P\ (1-P)}$$ Where:

S = Required Sample size

X = Z value (e.g., 1.96 for 95% confidence level)

N = Population Size

P = Population proportion (expressed as decimal) (assumed to be 0.5 or 50%)

d = Degree of accuracy (5%), expressed as a proportion (.05)

N = 131,579 which is the total number of households in the two municipal areas

$X^2 = 3.841$

P = 0.5

$d^2 = 0.05$

$$S = \frac{3.841 * 131{,}579 * 0.5 * 0.5}{((0.05)^2 * (131{,}579 - 1)) + (3.841 * 0.5 * 0.5)}$$

$$S = \frac{126348.73}{329.905}$$

$$S = \mathbf{383}$$

Figure 2

Schematic Flow of Work
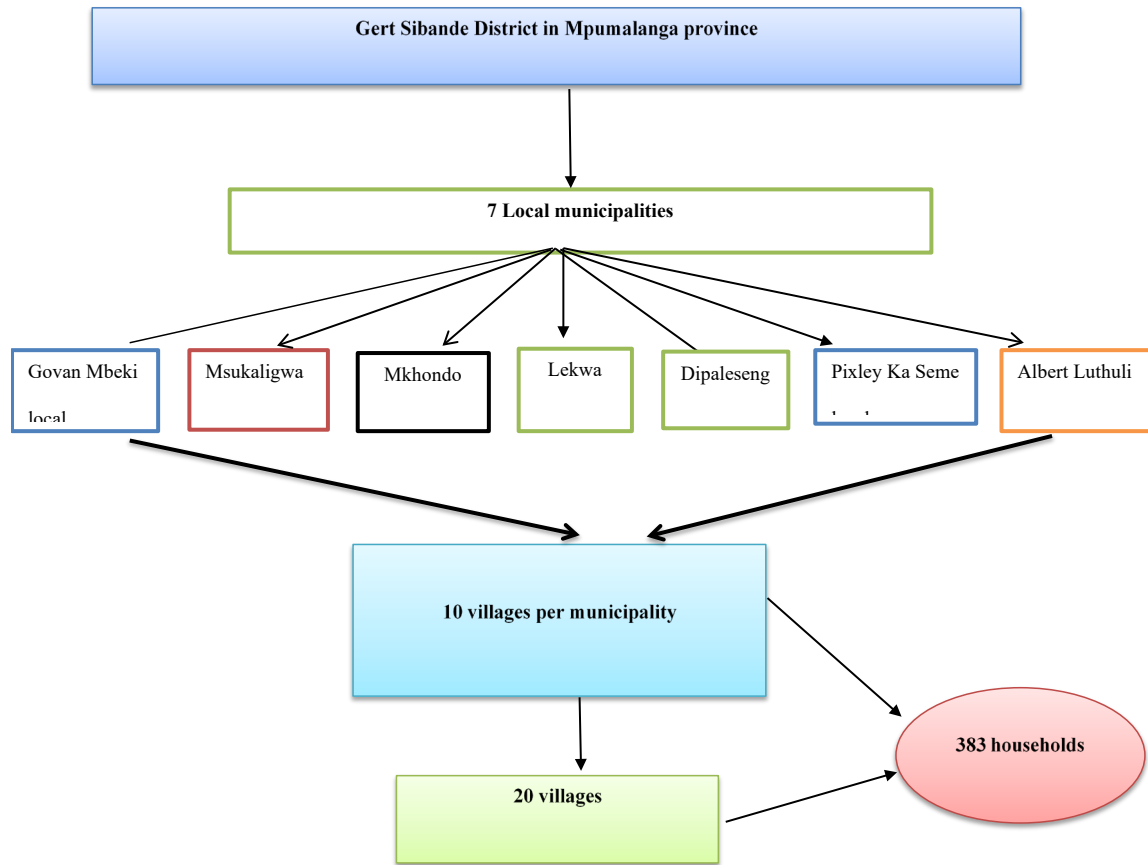
Statistical Analytical Structure

The data obtained from the study were analyzed using Microsoft Excel, IBM SPSS Statistics (Version 25) predictive analytical software, and STATA Statistical Software (Version 16). This section illustrates how the result analyzed from the sample was achieved and explained. Descriptive statistics were used to describe households' demographics, socio-economic characteristics, and other survey data. Statistical

calculations and graphical representations such as standard deviations, mean and variance were all achieved.

Calculating the Households' Food Security Status Using Household Food Insecurity Assessment Scale (HFIAS)

The data collected from this study were computed to categorize households into their food security levels. The Household Food Insecurity Assessment Scale (HFIAS) has been used over the years by several researchers to assess the food security status of households. The instrument was developed by the Food and Nutrition Technical Assistance (FANTA) project (Deitchler et al., 2010; Faber et al., 2009; Wiesmann et al., 2009). It has been used globally to measure the rate of food insecurity in rural households and check the level of food shortage and poor dietary intake in rural communities.

The HFIAS is a composite index calculated for each household consisting of nine key questions designed to measure the severity of household food insecurity for the past 30 days (Table 1). If a respondent answers "yes" to a question, a frequency question is asked to assess whether the event happened rarely (once or twice), sometimes (three to ten times), or often (more than ten times) in the past four weeks. "Rarely," "sometimes," and "often" are assigned scores of 1, 2, and 3, respectively (Table 1). The HFIAS score is the sum of codes for each frequency question. It ranges from 0 to 27. The higher the score, the more severity of food insecurity the households experience (Adams et al., 2003); the lower the score, the more food secured the households are. The household becomes more food insecure (Davies, 2016) as their response reveals intense difficulties to access food frequently (Bhattacharya et al, 2004).

Table 1

Household Food Insecurity Access Scale (HFLAS) Questions

No.	Questions
1	In the past four weeks, did you worry that your household would not have enough food? 0 = No (skip to Q2) 1 = Yes
1a	How often did this happen? 1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)
2	In the past four weeks, were you or any household member not able to eat the kinds of foods you preferred because of a lack of resources? 0 = No (skip to Q3) 1 = Yes
2a	How often did this happen? 1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)
3	In the past four weeks, did you or any household member have to eat a limited variety of foods due to a lack of resources? 0 = No (skip to Q4) 1 = Yes
3a	How often did this happen? 1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)
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 a lack of resources to obtain other types of food? 0 = No (skip to Q5) 1 = Yes
4a	How often did this happen? 1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)
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? 0 = No (skip to Q6) 1 = Yes
5a	How often did this happen? 1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)

No.	Questions
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? 0 = No (skip to Q7) 1 = Yes
6a	How often did this happen? 1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)
7	In the past four weeks, was there ever no food to eat of any kind in your household because of lack of resources to get food? 0 = No (skip to Q8) 1 = Yes
7a	How often did this happen? 1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)
8	In the past four weeks, 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
8a	How often did this happen? 1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)
9	In the past four weeks, did you or any household member go a whole day and night without eating anything because there was not enough food? 0 = No 1 = Yes
9a	How often did this happen? 1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)

Note. Source adapted from Coates et al. (2007)

Secondly, the households were classified into four food insecurity categories: food secure, mildly food insecure, moderately food insecure, and severely food insecure. This was achieved by using the HFIAS categorization scheme shown in Table 2.

Table 2

Calculation of Household Food Insecurity Access Categorical Variable

HFIA Categories	Calculation
Food secure	HFIA category = 1 IF (Q1a = 0 or Q1a = 1) and Q2 = 0 and Q3 = 0 and Q4 = 0 and Q5 = 0 and Q6 = 0 and Q7 = 0 and Q8 = 0 and Q9 = 0
Mildly Food Insecure	HFIA category = 2 IF (Q1a = 2 or Q1a = 3 or Q2a = 1 or Q2a = 2 or Q2a = 3 0r Q3a = 1 or Q4a =1) and Q5 = 0 and Q6 = 0 and Q7 = 0 and Q8 = 0 and Q9 = 0
Moderately Food Insecure	HFIA category = 3 IF (Q3a = 2 or Q3a = 3 or Q4a = 2 or Q4a = 3 or Q5a = 1 or Q5a = 2 or Q6a = 1 or @6a = 2) and Q7 = 0 and Q8 = 0 and Q9 = 0
Severely Food Insecure	HFIA category = 4 IF Q5a = 3 or Q6a = 3 or Q7a = 1 or Q7a = 2 or Q7a = 3 or Q8a = 1 or Q8a = 2 or Q8a = 3 or Q9a = 1 or Q9a = 2 or Q9a = 3

Note. Source adapted from Coates et al. (2007)

Foster-Greer-Thorbecke (FGT) Indices for Household Poverty Status

FGT poverty Index was used as the major scientific analysis to categorize the households into poverty status. In this study, the households' per capita monthly income was used to determine their poverty status. Foster-Greer-Thorbecke (FGT) poverty index was used to categorize the poverty status of households in the study area. As a generalized measure of poverty, the FGT index is an inferential statistic used to measure households' poverty status. It combines information on the extent of poverty (as

measured by the head count ratio), the intensity of poverty (as measured by the total

poverty gap), and severity of poverty (Haughton & Shahidur, 1970).

The formula for the FGT is given by:

$$FGT_\alpha = \frac{1}{N} \sum_{i=1}^{H} (\frac{z - y_i}{z})^\alpha$$

………………………………………………………………………….(1)

Where

N is the total number of populations under consideration

H is the number of the poor (those with incomes at or below z)

y_i is the individual income of the i-th poor

Z represents the poverty line, and α is a parameter characterizing the degree of poverty

aversion, i.e. the parameter α determines the precise measure of poverty. When α equals

zero, the head count ratio (H) is generated; when α equals one, the poverty gap ratio (PG)

is generated (often considered as representing the depth of poverty); and when α equals

two, the poverty severity (PS) is generated.

Regression Models of Factors Influencing Households Food Insecurity and Poverty

Status in Mpumalanga Province of South Africa

The following OLS model was used to evaluate the factors influencing the

farming household's food insecurity status.

$$Y_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 \ldots + \beta_n X_n + \varepsilon_i \ldots \ldots \ldots \ldots \ldots \ldots (2)$$

Where Y_i is a continuous variable denoting the severity of food insecurity. X_1 to X_n are

the independent variables described in Table 3.3. ε_i is the error term.

A binary logistic regression model was employed to determine the factors influencing the farming households' poverty status. The binary logistic regression model is stated as:

$$\text{Logit(p)} = \text{Log}\left(\frac{p}{1-p}\right) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 \ldots + \beta_n X_n \ldots\ldots\ldots\ldots\ldots\ldots\ldots (3)$$

where $p = prob(Y_i = 1)$.

Y_i is the binary variable with a value of 1 if respondents are in poverty and 0 otherwise. β_0 is the intercept (constant), and β_1, β_2, to β_n are the regression coefficients of the predictor variables, X_1, X_2, and Xn. The logistic regression model is widely used to analyze data with dichotomous dependent variables. Hence, it was considered a suitable model for this research because the dependent variable was dichotomous. The model will be estimated by the Maximum Likelihood method. All the dependent and independent variables are described in Table 3.

Table 3

Factors Influencing Household Food Insecurity and Poverty Status in Gert Sibande Municipality of Mpumalanga Province South Africa

Variable	Description
Dependent Variable	
HFIAS score	Continuous
Poverty status	1=Below poverty line; 0=Above poverty line
Independent Variable	
Gender	1=Male; 0=Female
Age of household head	Continuous
Education level	1 = No formal education; 2=Primary education

Variable	Description
	3=Secondary education; 4=Tertiary education
Household size	Number of members
Housing ownership	1=Own; 0=Rent
Cooking energy	1=Electricity; 0=Other
Access to farming land	1=Yes; 0=No
Crop grown	1=Cereal; 0=Other
Employment status of household head	1=Employed; 0=Unemployed
Employment income in Rands	Continuous
Access to social grant	1=Yes; 0=No
Receipt of remittance	1=Yes; 0=No
Access to government child support	1=Yes; 0=No
Access to government pension grant	1=Yes; 0=No

CHAPTER IV

Socio-Economic Characteristics, Food Security, and Poverty Dynamics of Farming

Households

This chapter presents the results of the descriptive and inferential analysis results in the study. The chapter also presents the results of the factors contributing to household food insecurity and poverty dynamics. Finally, this chapter elucidates the various income and nutrition (food intake).

Demographic Characteristics of Households in the Study Area

Table 4 illustrates the socio-economic characteristics of households in the study area. The sample is comprised of 383 households. In the study, 62.14% of the households were male-headed, while 37.90% were female-headed. This finding is in line with the traditional belief that households in Africa are predominantly male-oriented in nature. It is supported by several reports (Ajani & Ashagidigbi, 2008), which showed that the majority of the households were male-headed (Omotayo et al., 2017). In addition, the age distribution of the respondents reveals that most respondents fall into the age intervals of 46-55 years (42.30%) with an average age of 51.95 years in the pooled data set.

According to Aldrich and Cliff (2003), the age of the household head is highly important because it reveals whether the households benefit from the experience of the household head or the households have to base their decisions on the risk of taking advice from other households. This study indicates that the households were ageing as evidenced through the mean age of almost 52 years. The result further indicates that most households (56.14%) have between 1-5 family members. The mean household size of 5.39 (which could be interpreted as about five since we are dealing with human beings)

appears large considering the average income of these households. Large household size could lead to correspondingly insufficient food intake and poor health and might exacerbate poverty status (Omotayo, 2017).

In addition, the result shows that the majority (58.75%) of the respondents were married, while 21.67% were single. Being married can positively influence households' food and nutrition security because the wife and the children can secure additional sources of income for family needs and welfare. Furthermore, Table 4 presents the educational status of the household heads across the study area. It shows that 40.73% of the participants have secondary education. Higher number of educational years could have a positive influence on the ability of the households to know their diet, food composition and the need for diversity. Finally, the employment profile of the households shows that about half (48.30%) of the respondents were self-employed, indicating that self-employment is common in Mpumalanga province. This is an indication of the possibility of better livelihood among the households in the community.

Table 4

Demographic Characteristics of Household Heads

Households' characteristics	Category	Frequency	Percentage (%)	Mean
Gender	Male	238	62.14	
	Female	145	37.86	

(continued)

Households' characteristics	Category	Frequency	Percentage (%)	Mean
Age	18 – 35	13	3.39	
	36 – 45	80	20.89	51.95
	46 – 55	162	42.30	
	56 – 65	109	28.46	
	>65	19	4.96	
Household size	1-5	215	56.14	
	6-10	164	42.82	5.39
	11-15	4	1.04	
Marital status	Married	225	58.75	
	Never married	83	21.67	
	Widowed	37	9.66	
	Divorced	38	9.92	
Education level	No formal education	76	19.84	
	Primary Education	72	18.80	
	Secondary Education	156	40.73	
	Tertiary Education	79	20.63	
Employment status	Permanent employment	82	21.41	

(continued)

Households' characteristics	Category	Frequency	Percentage (%)	Mean
	Seasonal employment	28	7.31	
	Self-employed	185	48.30	
	Not employed	88	22.98	
Total		**383**	**100**	

Graphical Distribution of the Socio-Economic Characteristics of Respondents

Distribution of Respondents by Gender

Figure 3 shows that out of the 383 households interviewed, the majority (62.14%) of them were male-headed, while 37.86% were female-headed. It translates to the fact that most households in the study area are male-headed households. It also conforms with several existing studies showing most households in African nations are male-headed (Modirwa & Oladele, 2012; Posel, 2001; Tibesigwa & Visser, 2015)

Figure 3

Sex Distribution of Respondents
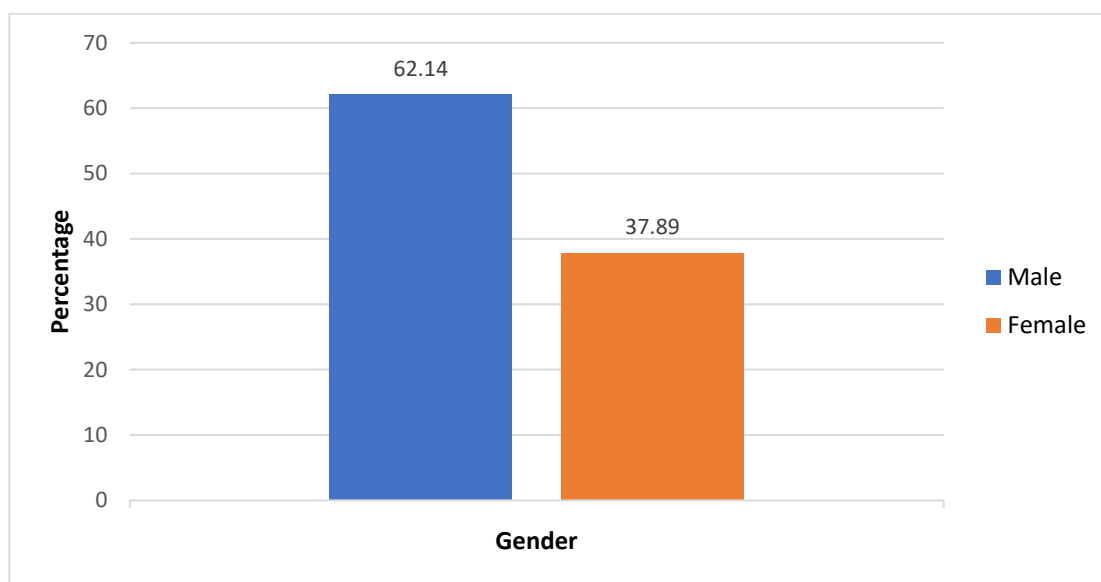
Respondents' Age Distribution

Figure 4 demonstrates the age distribution of household heads in the study area. The average age of the household heads was 51.95 years old. Only 3.39% of the respondents fell between the ages of 18 and 35 years; 20.89% of the respondents were between 36 and 45 years old; 42.30% of the respondents were aged from 46 to 55 years; 28.46% were from 56 to 65 years old; while almost 5% of the respondents were above 65 years old. Most (42.30%) of the respondents fell between the ages of 46 and 55 years. This indicates that the household heads are ageing, calling for proper plans and investments as most of the ageing household heads will soon be retired from active service.

Figure 4

Distribution of Household Head by Age Group
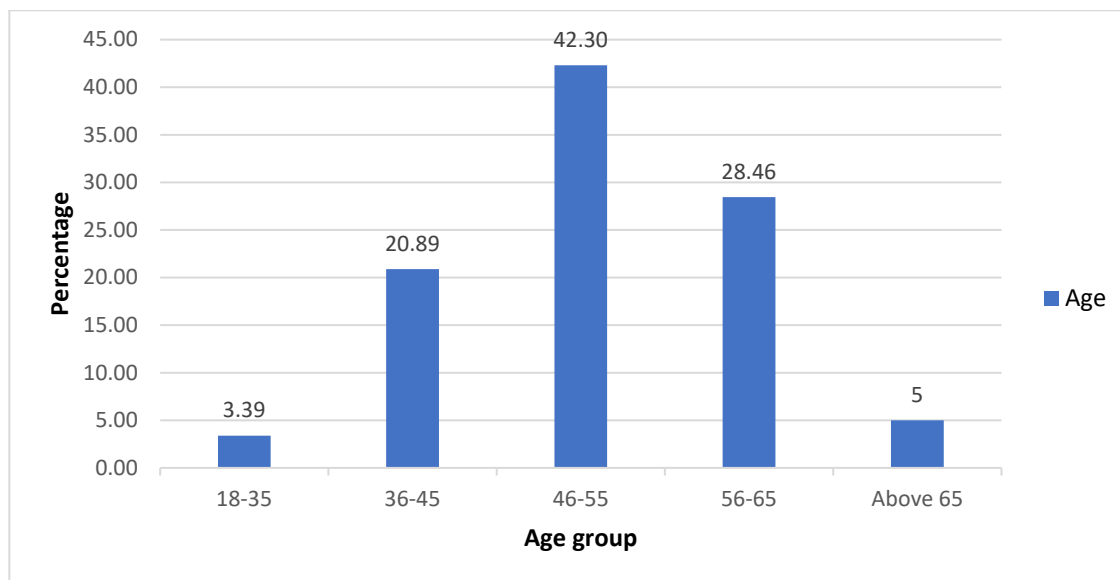
Respondents' Household Size

      Figure 5 shows that the majority (56.10%) of the households was comprised of 1 to 5 members, with an average household size of 5.39 members. If properly harnessed, household size can play a crucial role in poverty alleviation and food security. Large household size is a principal contributor to income and productivity of households, especially those of farming households in the rural parts of the developing nations (Olaniyi et al., 2013; Turyahabwe et al., 2013; Omotayo, 2020).

Figure 5

Distribution of Respondents' Household Size
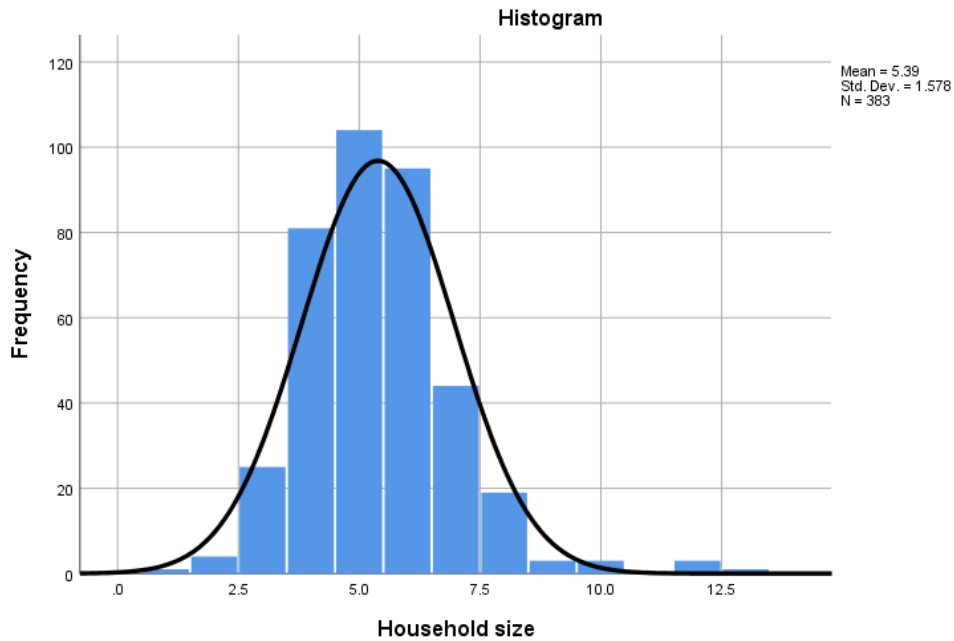
Educational Level of the Household Head

Figure 6 shows that the majority (40.73%) of household heads completed secondary education as the highest level of education. No formal education stood at close to 20%. About 18.80% completed primary education, while 20.63% of the household heads completed tertiary education. The high proportion of tertiary education indicates significant progress in university education in the study area since increased level of education plays a vital role in poverty reduction and food security (Nwokolo, 2015; Ogundari & Aromolaran, 2014; Omotayo et al., 2017; Omotoso et al., 2018).

Figure 6

Distribution of Respondents' Educational Attainment
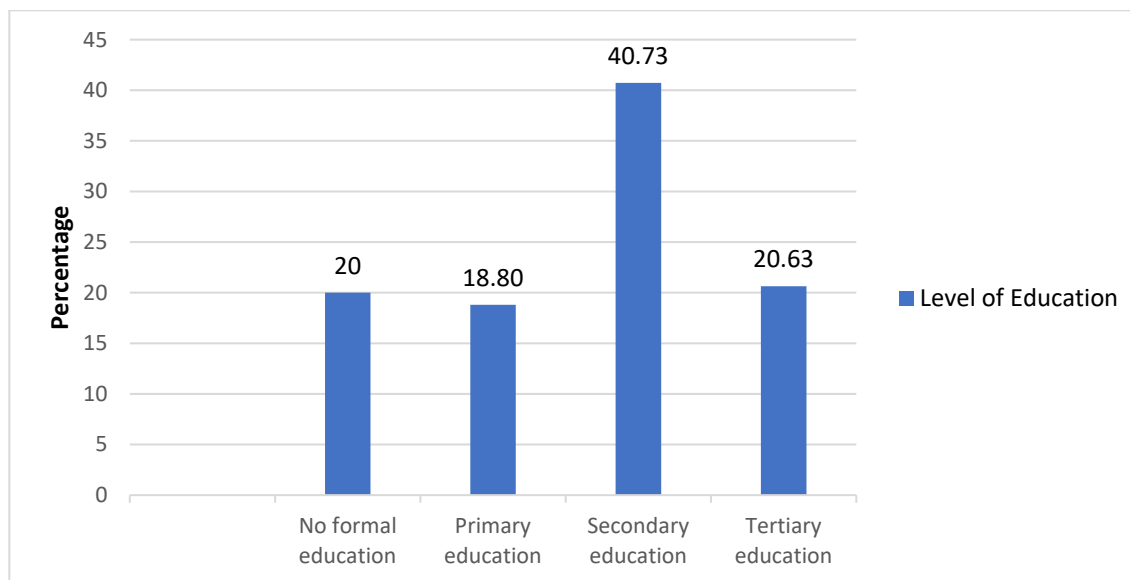
Household Heads' Employment Status and Livelihood Activities

Figure 7 shows that about 21.4% of the household heads were permanently employed, while most household heads (55.6%) depended on self and seasonal employment. About 23% of the household heads were not employed, which shows a high rate of unemployment in the study area. The high unemployment rate is astounding since unemployment has been a fundamental cause of food insecurity in a household (Aliber, 2003). Furthermore, most households (about 58%) depended on farm activities as their livelihood activities throughout the year. On-farm activities might include food production, crop production, livestock, unskilled wage labour, and agricultural labour. About 32.9% of the households depended on off-farm activities, and their incomes mainly came from skilled labour, salaries, and wages.

Figure 7

Distribution of the Employment Status of Household Head
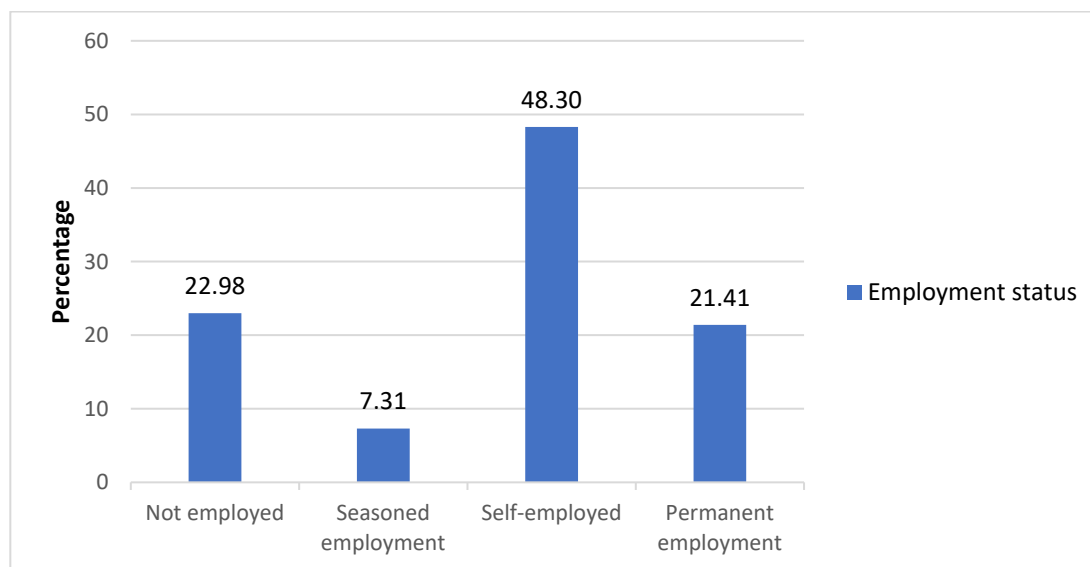
Figure 8

Distribution of Households' Livelihood Activities
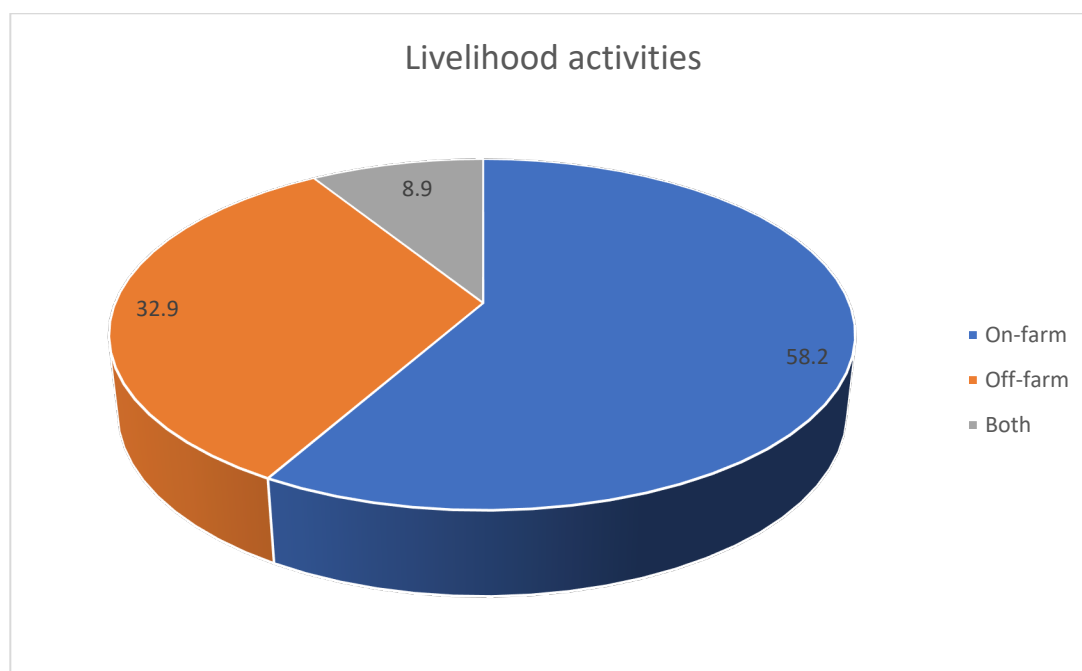
Household Monthly Income Class in the Study Area

Table 5 shows the income distribution of household heads. Most households (25.60%) earned a monthly income between R5001 and R10000, followed by 24.50% earning between R1.00 and R5000, a low-income level. The average household income was R12676.85 per month with a standard deviation of R9675.15. The wide dispersion shows disparities in the monthly income among respondents. However, the high average income earned in the study might indicate that poverty and food insecurity are at a minimal level in the province.

Table 5

Distribution of Households' Monthly Income

Monthly income	Frequency	Percentage (%)	Mean (S.D.)
R1.00-5000	94	24.54	
R5001-10000	98	25.59	
R1001-15000	70	18.28	
R15001-20000	61	15.93	
R20001-25000	24	6.27	
R25001-30000	17	4.44	R12676.85 (9675.15)
R30001-35000	8	2.09	
R35001-40000	6	1.57	

Monthly income	Frequency	Percentage (%)	Mean (S.D.)
R45001-50000	3	0.78	
R55001-60000	1	0.26	
>R60000	1	0.26	
Total	**383**	**100**	

Household Food and Non-Food-Expenditures

Figure 9 shows the food and non-food expenditures of households as a percentage of their monthly income. Households who earned less than R5000 spent 20.98% of their monthly income on food and 40.40% on non-food expenses on average. For households who made between R5001 and R10000, their average expenditures on food and non-food items were 22.60% and 64.76% of their income, respectively. As income increased from R10001 to over R20000, food and non-food expenditures as percentages of income both went down. Households earning above R20000 spent the lowest percentages of their income on food and non-food items. This trend clearly illustrates Engels law which stipulates that food expenditure decreases as income increases.

Figure 9

Distribution of Monthly Household Food and Non-Food Expenditures
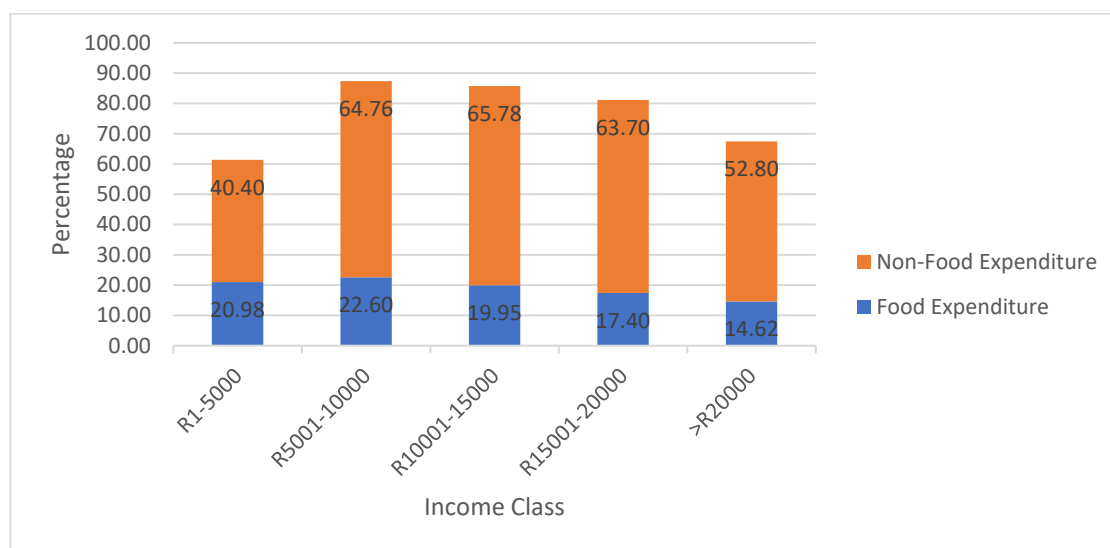
Farm Structure and Land Ownership

Figure 10 shows that cereals and vegetables are the most widely cultivated crop by farmers in the study area, whereas 17.8% and 6.3% of the farmers grow fruits and legumes, respectively. In this study (Figure 10), most of the households (89.56%) indicated that they had access to agricultural farmland, while 10.44% did not practice farming. About 93.47% of the households indicated that they had access to agricultural farm animals, while 6.53% did not raise animals.

Figure 10

Distributions According to Crop Grown by Households
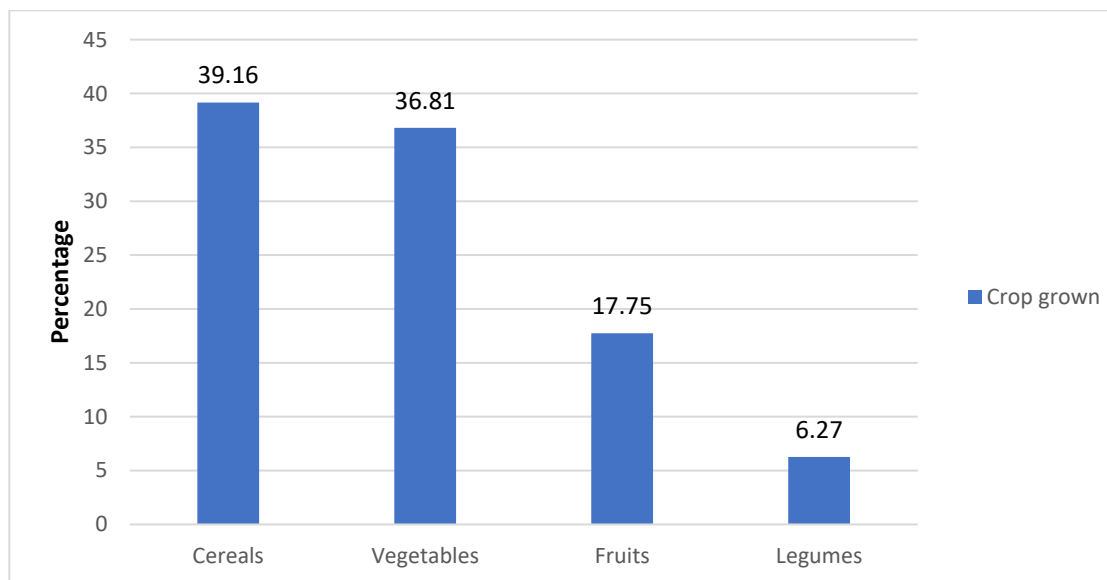
Figure 11

Distribution of Households' Access to Agricultural Farmland and Animals
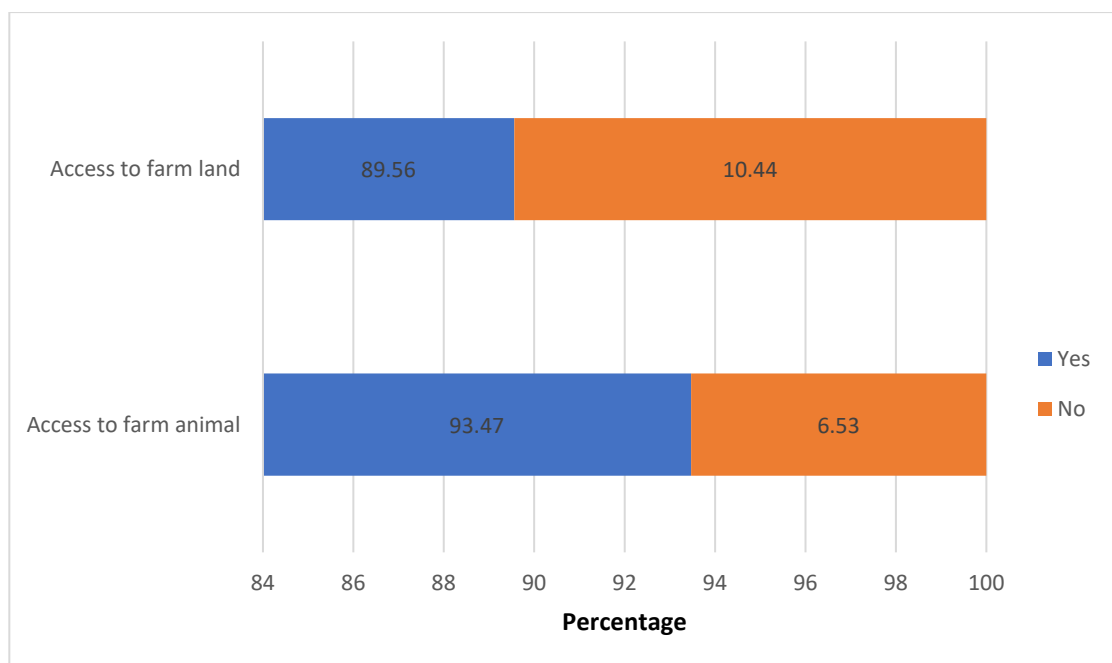
Respondents' Farm Size

Table 6 shows the land size and total land under cultivation for farming households. The average farm size under cultivation was 33.56 acres with a standard deviation of 64.96 acres. Farm holding ranges from 0.3 acres to 600 acres. It shows a high variation in farm holdings by households which might be a significant outcome for poverty reduction and food security in the study area.

Table 6

Distribution of Household Farm Size (Acres)

Variable	Minimum	Maximum	Mean	Std. Deviation
Land size	1	650	49.25	98.56
Total land under cultivation	0.3	600	33.56	64.96

Respondents' Housing Facilities

Table 7 shows the households' housing facilities in the study area. About 83.55% of the respondents owned a house, while 16.45% were renting. Brick house was the most (79.37%) common housing type, with only 12.01% of the respondents living in shacks. There was still some degree of poverty in the study area, with 6.50% staying in wooden houses, 1.80% in precast, and 0.26% in a stick and mud house. Furthermore, 98.43% of the households used electricity as their source of power, and 94.52% of the respondents indicated electricity as the source of cooking energy. The high coverage of electricity laid the foundation for economic development in the study area. In addition, the toilet facilities available in different houses across the study area were flush toilet inside the house (39.16%), flush toilet outside the house (23.76%), ventilated improved pit latrine

(35.25%), and open pit (1.83%). This shows a proper route of excreting management, although there is still a need for improvement since only 39.16% used the best type of toilet. However, there could be changes in other house toilet types over time.

Table 7

Distribution of Respondents Housing Facilities

Housing facilities	Category	Frequency	Percentage (%)
Household	Renting	63	16.45
	Owner	320	83.55
Housing types	Brick house	304	79.37
	Corrugated iron shack	46	12.01
	Wooden house	25	6.53
	Precast	7	1.83
	Stick and mud	1	0.26
Source of light	Electricity	377	98.43
	Candles	5	1.31
	No lighting	1	0.26
Source of cooking energy	Electricity	362	94.52
	Gas	1	0.26
	Coal	1	0.26
	Firewood	16	4.18
	Paraffine	2	0.52
	Solar energy	1	0.26
Toilet facilities	Flush toilet inside the house	150	39.16
	Flush toilet outside the house	91	23.76
	Ventilated improved pit	135	35.25
	latrine	7	1.83
	Open pit		
continued			
Water source	Public tap/piped water	283	73.89

(continued)

Housing facilities	Category	Frequency	Percentage (%)
	Borehole with pump	34	8.88
	Protected dug well or spring	23	6.01
	Pond, lake, river, or stream	11	2.87
	Rainwater	1	0.26
	Mobile tanker	31	8.09

Respondents' Food Security Profile

Table 8 shows the responses to the HFIAS questions. The results indicate that about 51% of the households worried about running out of food. 50% of the households were unable to eat their preferred meal due to a lack of resources. 50% of the households ate undesirable food because of a lack of resources. About 13% complained about not having food at all in the households, 12% of the households went to sleep hungry, and only 2% of the households indicated that they had no food to eat at all the whole day. A Household Food Insecurity Assessment Scale (HFIAS) score was calculated for each household. Based on the HFIAS categorization scheme outlined in Table 2, it was found that about a third (34.46%) of the households where food secure in the sample (Figure 11). Twenty-one percent of the households were severely food insecure.

Table 8

Percentage Distribution of Household Responses to the HFIAS Questions

Food access statement	Percentage of Yes responses
1. Worried about food	51
2. Unable to eat preferred meal due to lack of resources continued	50
3. Eat just a few kinds of food	46

Food access statement	Percentage of Yes responses
4. Ate undesirable meal due to lack of resources	50
5. Ate smaller meal due to not having enough food	43
6. Ate fewer meals or skipped some meals in a day	35
7. No food at all in the household	13
8. Went to sleep hungry	12
9. Did not eat at all for a whole day	2

Figure 12

Percentage Distribution of Households' Food Security Level
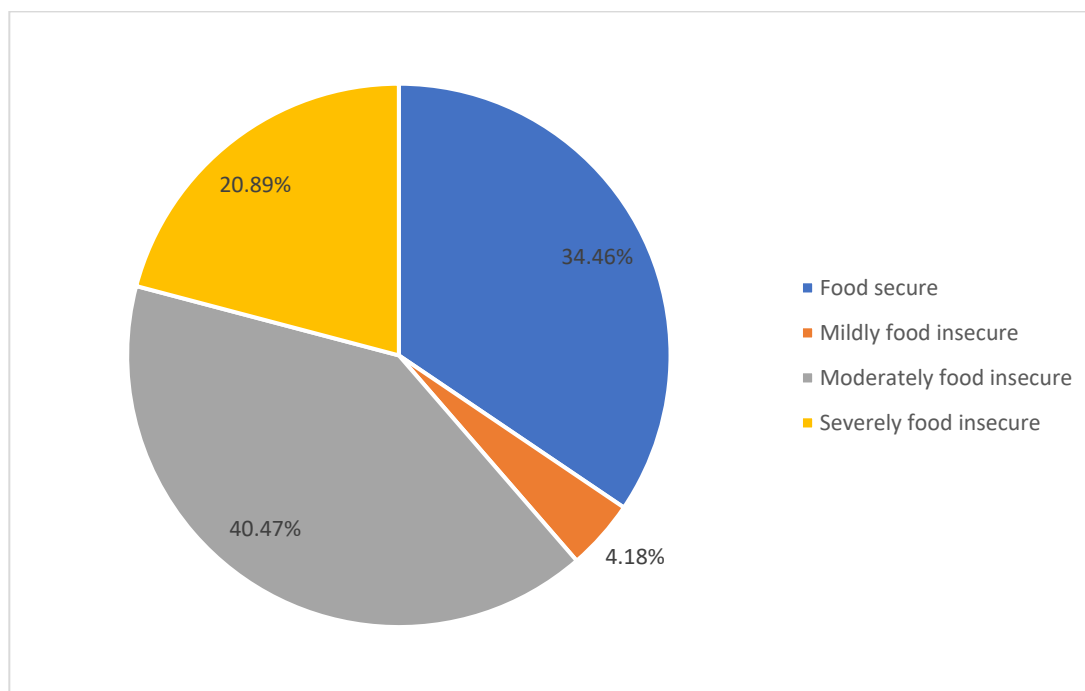
Poverty Status of Respondents

The FGT poverty indices were used to show the extent of poverty among the households in the study area. The poverty line (z) was set to be R1,268 per capita (Statistics South Africa, 2020). The poverty aversion parameters employed were H, PG,

and PS, which mean poverty incidence (headcount), depth, and severity, respectively (Table 9).

The incidence of poverty (H) in this study was 0.3264, indicating that 32.64% of the households were poor while the rest (67.36%) were categorized as non-poor households. Moreover, poverty depth (PG) among the sampled rural households was 0.1300, meaning that on average, each household member (both poor and non-poor) would need to increase their monthly income by 13% of the poverty line (R1268) to eliminate poverty in the sample. The poverty severity (PS) among the sampled farming households was 0.0727. Among the poor households in the sample, the average property gap per person was R504.94 $(z - y_i)$, which will be the minimum cost per person of eliminating poverty using transfer payment to the poor households. In other words, this will be the average cost per person of filling up each poverty gap. From the findings, it could be inferred that the existence of poverty abounds among the rural farming households in the study area, and it is high time that one proffered adequate measure will be used to alleviate poverty in the rural settlements.

Table 9

Poverty Status of Participating Households

FGT Poverty Indices		
FGT incidence	H	0.3264
FGT depth	PG	0.1300

(continued)

FGT Poverty Indices

FGT severity	PS	0.0727
	Poverty line (z)	R1268

Poverty Status	Frequency	Percentage
Above poverty line	258	67.36
Below poverty line	125	32.64
Total	**383**	**100**

Factors Influencing Households Food Insecurity in Gert Sibande Municipality of Mpumalanga Province South Africa

This section presents the factors influencing the households' food insecurity in the study area. To achieve this, OLS regression model was employed as presented in 3.6.3. of chapter 3. The household's food security status (Dummy variable) generated from the mean per capita food expenses (MPCHHFE) was used as dependent variable which was regressed against the explanatory variables.

Descriptive Statistics of Variables Included in the Models Predicting Food Insecurity and Poverty Status

Table 10 presents the descriptive statistics of the variables included in the models predicting food insecurity and poverty status of the households participating in this survey. The two dependent variables are "HFIAS score" and "poverty status." HFIAS score is a continuous variable measuring the severity of food insecurity. The HFIAS

score in the sample ranged from 0 to 24, with a mean score of 6.51. Poverty status is a

binary variable, with 1 being at or below the poverty line (R1,268) and 0 otherwise.

Table 10

Descriptive Statistics of Dependent and Independent Variables

	Mean	Std. Dev.	Min	Max
HFIAS score	6.51	6.18	0	24
Poverty status (1=Below poverty line; 0=Above poverty line)	0.33	0.47	0	1
Gender (1=Male; 0=Female)	0.62	0.49	0	1
Age of household head	51.95	8.84	27	80
Education level (1=No formal education; 2=Primary education; 3=Secondary education; 4=Tertiary education)	2.62	1.02	1	4
Household size	5.39	1.58	1	13
Housing ownership (1=Own; 0=Rent)	0.84	0.37	0	1
Cooking energy (1=Electricity; 0=Other)	0.95	0.23	0	1
Access to farming land (1=Yes; 0=No)	0.90	0.31	0	1
Crop grown (1=Cereal; 0=Other)	0.39	0.49	0	1
Employment status of household head (1=Employed; 0=Unemployed)	0.77	0.42	0	1
Employment income in **thousand Rands**	11.34	10.21	0	71
Access to social grant (1=Yes; 0=No)	0.24	0.43	0	1
Receipt of remittance (1=Yes; 0=No)	0.42	0.49	0	1
Access to government child support (1=Yes; 0=No)	0.12	0.32	0	1
Access to government pension grant (1=Yes; 0=No)	0.23	0.42	0	1

Note. The mean of dummy variables indicates the proportion of responses with a value of 1.

To avoid inconsistency and biasness from the estimated parameters, the study

subjected the variables to a multicollinearity test using the Collin command in STATA

16. The multicollinearity test was carried out with Variance Inflation Factor (VIF), and

the mean VIF was 1.41 (Table 11). All the VIF values were below 5, and the tolerance

values were above 0.2. A high level of tolerance computed for the variables indicates an

absence of serious multicollinearity in the analysis.

Table 11

Multicollinearity Test of Variables

Variable	VIF	Tolerance
Gender	1.02	0.9851
Age of household head	1.75	0.5729
Education level	2.11	0.4742
Household size	1.12	0.892
Housing ownership	1.1	0.9058
Cooking energy	1.04	0.9604
Access to farming land	1.26	0.7959
Crop grown	1.25	0.8004
Employment status of household head	1.78	0.5618
Employment income	1.94	0.5159
Access to social grant	1.61	0.6226
Receipt of remittance	1.21	0.8249
Access to government child support	1.19	0.8392
Mean VIF	1.41	

Estimates of an OLS Model Evaluating Factors Influencing Household Food

Insecurity in Mpumalanga Province of South Africa

OLS regression estimated parameters for the contributing factors to households'

food insecurity were explored here. In this section, HFIAS score (continuous variable)

was used as the dependent variable which was regressed against the explanatory

variables. Also, since some of the variables included to capture the respondents'

socioeconomic profile showed statistical significance, the null hypothesis of this study is

that there is no significant relationship between the households' socioeconomic

characteristics and food insecurity status is hereby rejected.

Out of the independent variables considered in the model (Table 12), six were statistically significant. These are housing ownership (p<0.05), cooking energy (p<0.05), crop grown (p<0.05), employment status of the household head (p<0.01), employment income (p<0.001), and access to government child support (p<0.001). Owning a house was positively correlated with food insecurity, whereas using electricity as the cooking energy and growing cereals were negatively associated with food insecurity.

The coefficient of the employment status of the household head was found to be negatively associated with food insecurity status (-2.10) at a significance level of 0.01. This indicates that the employment status of the households' heads has the probability of influencing the food insecurity status of the households. Being employed reduced the Household Food Insecurity Access Scale (HFIAS) Score by 2.10, with other factors held constant. This agrees with existing studies (Aragie & Genanu, 2017) showing the household heads' employment and income statuses are significant determinants of how or not food secured a household will be. Others include Muche et al.(2014) and Omotayo (2018). Furthermore, the coefficient for the households' income was negative (-0.29) and significant (p<0.001). For each one thousand Rand growth in income, the HFIAS score will be reduced by 0.29.

This indicates that the household heads' income has the probability of enhancing the food security status of the family. It corroborates with prior expectation as well as the findings of previous studies (Ahmed et al., 2017); in addition, access to government child support is positively associated with food insecurity (Aidoo et al., 2013). Perhaps food insecure households were more likely to receive government child support.

Table 12

OLS Results of the Correlates of Households' Food Insecurity

Variable	Coefficient	Std. Error	t value	P value
Gender	-0.06	0.45	-0.14	0.889
Age of household head	0.00	0.03	-0.13	0.900
Education level	-0.30	0.31	-0.96	0.336
Household size	0.09	0.15	0.59	0.556
Housing ownership	**1.42**	**0.62**	**2.29**	**0.022**
Cooking energy	**-2.07**	**0.98**	**-2.11**	**0.035**
Access to farmland	-0.83	0.80	-1.03	0.302
Crop grown	**-1.17**	**0.50**	**-2.33**	**0.020**
Employment status of household head	**-2.10**	**0.69**	**-3.04**	**0.003**
Employment income	**-0.29**	**0.03**	**-9.68**	**0.000**
Access to social grant	0.65	0.64	1.01	0.313
Receipt of remittance	-0.38	0.49	-0.78	0.436
Access to government child support	**2.97**	**0.74**	**4.02**	**0.000**
Intercept	13.58	2.48	5.47	0.000

Understanding the Determinants of Households' Poverty Status in Gert Sibande Municipality of Mpumalanga Province South Africa

This segment presents the results on the determinants of households' poverty status in Gert Sibande municipality of Mpumalanga province South Africa. A logit regression model was employed as presented in section 3.6.3. The household's poverty status (dummy variable) was generated based on whether the per capita monthly income was below the poverty line in 2020. It was regressed against selected explanatory variables.

Logit regression result of the determinants of households' poverty status in Gert Sibande municipality of Mpumalanga province South Africa was explained here. The results show that the model fitted the data very well, as shown by the statistical significance of the chi^2 ($p < 0.01$). Since some of the variables included to capture the

household's poverty status showed statistical significance, the null hypothesis of this study is hereby rejected.

The dependent variable in the model was households' poverty status, with value 1 if the household's monthly income per capita was below the poverty line and 0 otherwise. Among the variable fitted, four were statistically significant at different levels of significance. The four significant variables were household size ($p<0.001$), employment income ($p<0.001$), access to social grant ($p<0.01$), and receipt of remittance ($p<0.01$). Table 13 shows that the coefficient for household size was 2.77 with an odds ratio of 15.88. This implies that a larger household size was significantly associated with a higher probability of being poor. For each additional member in the household, the odds of being poor increased by a factor of 15.88. This is in line with the appropriate expectation that a larger household size could worsen the poverty status of the household (Damisa et al., 2011; Omotayo et al., 2018; Sarti et al., 2017).

Moreover, the coefficient of respondent's monthly income captured in thousand South African Rands (R) was negative (-1.87) at a significance level of 0.001. This indicates that an increase in the household head's income would decrease the probability of living below the poverty line. An odds ratio of 0.15 indicates that for each additional one thousand Rands, the odds of being poor decreased by 85%, holding other variables constant. This is in line with the existing literature as an increase in income could reduce the poverty level of households (Babatunde, 2008; Parka & Wangb, 2001; Bigsten et al., 2003). Meanwhile, access to social grants and receipt of remittance were both negatively

associated with households' poverty status, suggesting that providing social grants and

remittance might help alleviate poverty.

Table 13

Logit Regression Result of the Determinants of Households Poverty Status in Gert

Sibande Municipality of Mpumalanga Province South Africa

Variable	Coefficient	Odds Ratio	Z value	P value
Gender	-0.01	0.99	-0.02	0.983
Age of household head	0.04	1.04	0.66	0.507
Education level	0.02	1.02	0.05	0.961
Household size	**2.77**	**15.88**	**4.94**	**0.000**
Housing ownership	1.77	5.89	1.39	0.164
Cooking energy	-1.39	0.25	-1.37	0.170
Access to farming land	-1.25	0.29	-1.01	0.313
Crop grown	-1.14	0.32	-1.43	0.152
Employment status of household head	2.09	8.05	1.84	0.066
Employment income	**-1.87**	**0.15**	**-5.15**	**0.000**
Access to social grant	**-2.27**	**0.10**	**-2.63**	**0.009**
Receipt of remittance	**-2.79**	**0.06**	**-2.96**	**0.003**
Access to government child support	1.25	3.50	1.09	0.274
Intercept	-6.19	0.00	-1.57	0.117

CHAPTER V

Summary of Major Findings, Conclusion, and Policy Recommendations

Summary of Major Findings

The challenges posed by the risk of food insecurity, poverty, and hunger have been a major concern in many households in Sub-Saharan Africa and the world at large. This concern is attributable to the negative impacts of the ongoing COVID-19 pandemic, which has led to an increment in food prices and food shortages within South Africa. Therefore, understanding the factors contributing to farming households' food insecurity and poverty in Gert Sibande Municipality of Mpumalanga province, South Africa, remains pertinent for policy re-direction in the COVID-19 and post COVID-19 era. Only a few empirical works exist in the literature that investigates the food security and poverty among farming households in Gert Sibande Municipality of Mpumalanga province South Africa recently. These existing literatures were at most with partial treatment of these concepts. A holistic approach is therefore needed to establish the key determinants of these two concepts. Thus, this study specifically investigated the factors contributing to farming households' food insecurity and poverty in Gert Sibande Municipality of Mpumalanga Province, South Africa.

Descriptive analysis of the respondent's socioeconomic characteristics revealed that 62% of the households were male-headed while 38% were female-headed. In addition, the age distribution revealed that the majority (or 42%) of the household heads fell into the age intervals of 46-55 years and an average age of 52 years in the pooled data set. The study indicates that the households were aging, as evidenced through the mean

age of 51 years. The result further indicates that about half of the households (56.10%) had between 1-5 family members. The median household size of 5 appears large considering the average income of these households.

In addition, the result shows that the majority (58.75%) of the respondents were married, while 21.67% were single. Moreover, the educational status of the household's heads shows that 40.73% of the participants had secondary education. Also, the employment profile of the households shows that only 21.41% of the household heads were permanently employed. The majority (55.61%) of the household heads either were self-employed (48.30%) or depended on seasonal employment (7.31%). Furthermore, most (58.22%) of the households depended on farming as their livelihood activities throughout the year, such as food production, crop production, livestock, unskilled wage labour, and agricultural labour, were 32.9% depended on off-farm activities like skilled labor, salaries, and wages. The rest (8.88%) depended on both on-farm and off-farm activities.

Additionally, most households (25.59%) earned a monthly income between R5001 and R10000, followed by 24.54% earning between the ranges of R1.00 – R5000. The average household income stood at R12676.85 per month with a standard deviation of 9675.15. Regarding households' food and non-food expenditures, households who earn less than R5000 spent 20.98% of their income on food and 40.40% on non-food expenses. For households earning between R5001 and R10000, they spent 22.60% on food and 64.76% on non-food expenditures. Households earning above R10000 spent a smaller percentage of their income on food. The HFIAS category indicated that 34.46% of the households were food secure, and others were mildly (4.18%), moderately

(40.47%), or severely (20.89%) food insecure. In addition, the FGT poverty index

showed that the incidence of poverty (θ_0) in this study was 0.3264, indicating that

32.64% of the households were poor while the rest (67.36%) were categorized as non-

poor households.

The study further applied two models, including an OLS regression and a

Logistics regression, in two empirical sections (4.5 and 4.6). In the OLS regression of

factors influencing farming households' food insecurity, six out of the variables analyzed

were either positively or negatively significant. Using electricity as the cooking energy,

growing cereals, being employed, and employment income were negatively associated

with food insecurity, whereas housing ownership and access to government child support

were positively associated with food insecurity. Logistic regression model of the

determinants of households' poverty in Gert Sibande Municipality of Mpumalanga

Province of South Africa showed four factors, including household size, employment

income, access to social grant, and receipt of remittance, were significantly associated

with households' poverty status in the study area.

Conclusion

Food insecurity and poverty are major problems of many households in

developing nations. In South Africa, these duo-threats constitute physical and economic

problems by eating deeply into the nutritional and health base of the victims. This study,

therefore, evaluated the factors contributing to farming households' food insecurity and

poverty in Gert Sibande Municipality of Mpumalanga Province of South Africa. This

study recognized the knowledge gaps, encouraged new thinking, and stimulated concrete

actions on leveraging agriculture to improve farming households' food security and

poverty status. The finding of the study concludes that farmers in the study were gradually ageing, evidenced in the mean age of 52 years. Also, large household size was recorded in the research as the study recorded a medium household size of 5 in the study area. A larger household size could result in lower income per capita, leading to food insecurity and poverty in the study area.

Furthermore, the highest educational attainment was secondary school education (high school). A better education could have a positive influence on the ability of the farmers to be food secured as well as be free from poverty. In addition, there is presence of food insecurity (35.77%) and poverty (39.68%) among the farming households in the study area. This shows an increase in the food insecurity and poverty status of the study area. This could be due to the ripple effect of the COVID-19 pandemic. Of a truth, the South Africa's government and other stake holders have taken several steps to address food insecurity and poverty as a limiting factor for sustainable agriculture since several socio-economic variables persistently constitute to the full achievement of the sustainable agricultural system.

The findings of this research emphasized the significance of employment income as a significant contributor to farming households' food security and poverty in the two models. Households' employment income came from three major sources: seasonal, permanent, and self-employment. There is a severe need to enhance agricultural production by the households to foster income realization hence, poverty reduction in the study area. The average monthly incomes of households relying on farming activities and off-farm activities as their primary livelihood activities were R12,430 and R10,865, respectively. For households relying on both on-farm and off-farm livelihood activities,

their average monthly income ($21,008) was almost two times that of those depending on one source of livelihood. Therefore, involvement in both on-farm and off-farm livelihood activities might help the households get out of food insecurity and poverty.

Finally, it was concluded that low household head's income and large household size were major problems identified in the study. Farming households' capability to endure shocks like food insecurity and poverty was greatly determined by their respective asset portfolios, such as financial, physical, and intangible human assets. Households' food security has a tangible effect on the well-being of the farming households. The findings of this study stressed the need for the government to enhance the food insecurity and poverty among the farming households in Gert Sibande Municipality of Mpumalanga province of South Africa through capacity development and skill-building programs.

Policy Recommendation

These results can serve as inputs for developing evidence-based policy interventions to promote farming households' food security and prosperity, particularly in the rural areas of South Africa, putting the farmers' perceptions and needs into account. Based on the outcomes of this study, the following policy implication and recommendations are made:

(1) Farming households in the study area are gradually ageing. There should be an encouragement of younger people in agriculture by implementing policies that will make agriculture more lucrative so that the continuously migrating youths will practice agriculture in the nation's rural communities.

(2) Education attainment of the farmers is very low. It contributes to farming households' food intake, food security, and poverty status. Therefore, it is suggested that school enrolment should be encouraged, and the standard of education should be enhanced by the government of the day through extension agencies so the farmers will be knowledgeable about the importance of various food nutrition and food security and their implication on the sustainable agricultural system.

(3) The large household size was also identified among the farming households in the study. There should be a proper orientation of farming households on family planning methods.

(4) Quality and frequency of food intake are important pillars of food security. The rural households should be enlightened on the various food classes and the need for a balanced diet. The various government administrators should mobilize nutritionists and trained agricultural extension officers to educate the farmers on the need to eat adequate meals. Also, needed assistance and encouragement should be given to farmers to plant different types of food crops as this will help meet their nutritional requirement since they signified that they eat from their own produce.

(5) Encouragement of farming and off-farm livelihood activities is important for a sustainable economy, especially in the rural communities of South Africa. There should also be more serious interventions by the government of consistent mobilization of resources, formulation, and implementation of holistic policies and programs that promote awareness and provision of agricultural input subsidies for the small-scale farmers.

(6) The study reveals that the household head's employment status and income level may help households get out of food insecurity and poverty. There should be a proper orientation of farmers by extension workers through informal education, information dissemination, and more effective communication on the effect of regular income and food security on the

poverty status as well as its economic implication on their wellbeing just like that of HIV crusade.

Future Research Directions

This study investigated the factors contributing to farming households' food insecurity and poverty status in Gert Sibande Municipality of Mpumalanga Province, South Africa. Further studies are expected to be undertaken on the nutrition outcomes, which often are analyzed in terms of labor productivity or labor supply decisions at the household level. Furthermore, more studies on the effect of the COVID-19 pandemic on household livelihood need to be explored in the study area, South Africa, and the developing nations at large. Finally, extensive impact analysis research in South Africa needs to be carried out to understand the extent of economic damage caused by the COVID-19 pandemic, especially on the households' food security and poverty status at the rural and urban levels.

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APPENDIX A

Survey Questionnaire

TOPIC: UNDERSTANDING FACTORS CONTRIBUTING TO HOUSEHOLD FOOD INSECURITY AND POVERTY DYNAMICS IN GERT SIBANDA DISTRICT MPUMALANGA PROVINCE OF SOUTH AFRICA

Please read the following consent form: "My name is --------------------------. I am collecting information here in ----------------- village. I would like to ask you to participate in a one-to one interview on the food security status and poverty dynamics in Gert Sibanda district of Mpumalanga province. The discussion will take about 30 minutes. Please answer all the questions truthfully. You will not be judged on your responses and we ask you to be sincere in your responses.

There is no direct benefit, money or compensation to you in participating in this study. Your participation is voluntary. You may refuse to answer any question and you may choose to stop the discussion at any time. Refusing to participate will not affect you or your family in any way. However, we hope that the research will benefit Mpumalanga Province by helping us understand the food security status of households and other factors contributing to the poverty level of this district. The researchers will keep your responses confidential and only researchers involved in this study will review the discussion notes. Do you have any questions for me? You may ask questions about this study at any time."

SECTION A: SOCIO-DEMOGRAPHIC INFORMATION

No.	Variables	Code	Response
1	Gender	0 = Female	
		1 = Male	
2	Age	1 = 18 – 35 yrs…………	
		2 = 36 – 45 yrs…………	
		3 = 46 – 55 yrs…………	
		4 = 55 - 65 yrs…………	
		5 = Above 65 yrs	
3	Level of education	1 = No formal education.	
		2 = Primary education	
		3 = Secondary education	
		4 = Tertiary education	
		5 = Other (Please specify)	

continued

No.	Variables	Code	Response
4	Marital Status	1 = Married	
		2 = Unmarried.	
		3 = Divorced	
		4 = Widowed/Widower	
		5 = Other (Specify)	
5	How many people are currently living in your household?	Number	

SECTION B: HOSUING AND FACILITIES

6	Are you renting or owning the place where you are staying?	1 = Own	
		2 = Rent	
7	Type of Housing	1 = Corrugated Iron Shack	
		2 = Wooden House	
		3 = Precast House	
		4 = Brick House	
		5 = Other (please specify)	
8	What type of toilet facility does your household uses	1 = Flush toilet inside the house	
		2 = Flush toilet outside the house	
		3 = Ventilated improved pit latrine	
		4 = Open pit (No walls)	
		5 = Bucket toilet	
9	What is the main source of lighting for this house?	1 = Electricity	
		2 = Kerosene (Paraffin)	
		3 = Candles	
		4 = Battery flashlights	
		5 = No lighting	

continued

10	What is the main source of water for your household?	1 = Public tap/piped water 2 = Borehole with pump 3 = Protected dug well or spring 4 = Pond, lake, river or stream 5 = Rainwater 6 = Mobile tanker
11	Main source of energy for cooking	1 = Electricity 2 = Gas 3 = Coal 4 = Firewood 5 = Paraffin 6 = Solar energy 7 = others, (Please specify)
12	Please specify on average how much is spent on the source of energy per month	Rands(R) _____

SECTION C: FARM STRUCTURE

13	Does your household have access to agriculture/farming land?	1 = Yes 2 = No
14.1	If yes, total land you have access to	_____ acres
14.2	Total land under cultivation	_____ acres
15	Types of crop grown	1 = Cereals (maize, millet, sorghum) 2 = Legumes (beans, cowpeas, groundnuts) 3 = Vegetables (Tomatoes, spinach, greens) 4 = Fruits = (Banana, mangoes, avocadoes) 5 = others, (please specify)
16	Does your household own or have access to any farm animal?	1 = Yes 2 = No

SECTION D: HOUSEHOLD MAIN LIVELIHOOD ACTIVITIES

17	Employment Status	1 = Not employed
		2 = Seasonal employment
		3 = self-employed
		4 = Permanent employment
		5 = Other (Please Specify)
18	What are your household's main livelihood activities throughout the year?	1 = Food crop production
		2 = Livestock production
		3 = Fishing
		4 = Hunting
		5 = Seller, commercial activities
		6 = Unskilled wage labour
		7 = Agricultural labour
		8 = Skilled labour
		9 = Salaries, wages (employees)
		10 = others, (please specify)
19	Monthly income from different sources	
20.1	Seasonal employment	Amount in Rands (R)
20.2	Permanent employment	Amount in Rands (R)
20.3	Social grant	Amount in Rands (R)
20.4	Self-employment (Business)	Amount in Rands (R)
20.5	Remittances	Amount in Rands (R)
20.6	Other (Specify)	Amount in Rands (R)
21	Total monthly household cash income	1 = 0-R 3000.00
		2 = R 3001- R 7000.00
		3 = R 7001 – R 15 000.00
		4 = R 15 001 – R 25 000.00
		5 = R 25 000.00 and above
22	Amount spent on food expenditure	1 = 0-R 3000.00
		2 = R 3001- R 7000.00

		3 = R 7001 – R 15 000.00
		4 = R 15 001 – R 25 000.00
		5 = R 25 000.00 and above
23	Amount spent on non-food expenditure	1 = 0-R 3000.00
		2 = R 3001- R 7000.00
		3 = R 7001 – R 15 000.00
		4 = R 15 001 – R 25 000.00
		5 = R 25 000.00 and above
24	Which of the following Government Grant do you receive	
25.1	Child Support Grant	0=No; 1=Yes
25.2	Disability Grant	0=No; 1=Yes
25.3	Pension Grant	0=No; 1=Yes
25.4	Other (Specify)	0=No; 1=Yes

SECTION E: FOOD ACCESS AND CONSUMPTION PATTERN

Number of days

HOUSEHOLD FOOD INSECURITY ACCESS SCALE (HFIAS)

	(Please note the following: Rarely: once or twice; Sometimes: 3 to 10 times; Often: more than 10 times in the past four weeks)			
1	In the past four weeks, did you worry that your household would not have enough food? (**if answer is No, skip to Q2)**	1: Yes	0: No	
1a	How often did this happen?	1: Rarely	2: Sometimes	3: Often
2	In the past four weeks, were you or any household member not able to eat the kinds of foods you preferred because of a lack of resources? (**if answer is No, skip to Q3)**	1: Yes	0: No	
2a	How often did this happen?	1: Rarely	2: Sometimes	3: Often
3	In the past four weeks, did you or any household member have to eat a limited variety of foods due to a lack of resources?	1: Yes	0: No	
3a	How often did this happen?	1: Rarely	2: Sometimes	3: Often

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 a lack of resources to obtain other types of food **(if answer is No, skip to Q5)**	1: Yes		0: No
4a	How often did this happen?	1: Rarely	2: Sometimes	3: Often
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	1: Yes		0: No
5a	How often did this happen?	1: Rarely	2: Sometimes	3: Often
6	In the past four weeks, did you or any other household member have to eat fewer meals in a day because there	1: Yes		0: No
6a	How often did this happen?	1: Rarely	2: Sometimes	3: Often
7	In the past four weeks, was there ever no food to eat of any kind in your household because of lack of resources to get food?	1: Yes		0: No
7a	How often did this happen?	1: Rarely	2: Sometimes	3: Often
8	In the past four weeks, did you or any household member go to sleep at night hungry because there was not enough	1: Yes		0: No
8a	How often did this happen?	1: Rarely	2: Sometimes	3: Often
9	In the past four weeks, did you or any household member go a whole day and night without eating	1: Yes		0: No
9a	How often did this happen?	1: Rarely	2: Sometimes	3: Often

APPENDIX B

agri'culture, rural development,
land & environmental affairs
MPUMALANGA PROVINCE
REPUBLIC OF SOUTH AFRICA

Samora Machel Building, No. 7 Government Boulevard, Riverside Park, 1200, Mpumalanga Province
Private Bag X 11219, 1200
Tel: +27 (013) 766 6067/8, Fax: +27 (013) 766 8295, Int Tel: +27 (13) 766 6067/8, Int Fax: +27 (13) 766 8295

Litiko Letekulima, Kutfutfukiswa Kwetindzawo Tasemakhaya, Temhlabe Netesimondzawo	Departement van Landbou, Landelike Ontwikkeling, Grond en Ongewing Sake	iJmNyango wezelimo UkuThu hukiswa kweeNdawo zemaKhaya, ifJarha neeNdaba zeBhoduluko

"Enq: Ms MH Sekoma
Tel.no: 013 766 6020

15 October 2020

Mr Agboola Peter Temitope
Department of Agricultural Sciences
College of Science and Engineering Technology
Sam Houston State University
Huntsville, Texas, USA

tpa007tBshsu.edu

Dear Mr Temitope

RE: REQUEST FOR PERMISSION TO CONDUCT AN ACADEMIC STUDY RESEARCH

1. The above matter refers,
2. Department of Agriculture, Rural Development, Land and Environmental Affairs (DARDLEA) supports initiatives of research especially in the Agricultural Sector.
3. These kind of studies add value and knowledge base within the sector.
4. It is against that backdrop that we support and permit you to visit and engage farmers and their extension officers for the purpose of data collection as per the request.
5. You will be expected to make your own arrangements in selecting the farmers and visiting them for interview.
6. The Department however, request that the findings be shared with it to add value into management of its programmes.
7. For further arrangement and assistance liaise with the District Director; Gert Sibande Mr GO Xaba 082 486 6370.

I hope you shall find the above in order

Kind Regards,

DR MC DAGADA
(A)HEAD: AGRICULTURE, RURAL DEVELOPMENT, LAND
AND ENVIRONMENTAL AFFAIRS

APPENDIX C

IRB #: IRB-2020-224
Title: Understanding Factors Contributing to Household Food Insecurity and Poverty Dynamics in Gert Sibanda District, Mpumalanga Province of South Africa
Creation Date: 8-12-2020
End Date:
Status: Approved
Principal Investigator: Temitope Agboola
Review Board: SHSU IRB
Sponsor:

Study History

Submission Type	Initial	Review Type	Exempt	Decision	Exempt

Key Study Contacts

Member		Role		Contact	
Member Lawrence Wolfskill		**Role** Investigator		**Contact** wolfskill@shsu.edu	
Member Danhong Chen		**Role** Co-Principal Investigator		**Contact** dxc062@shsu.edu	
Member Shyam Sivankutty Nair		**Role** Investigator		**Contact** shyam.nair@shsu.edu	
Member Temitope Agboola		**Role** Principal Investigator		**Contact** tpa007@shsu.edu	
Member Temitope Agboola		**Role** Primary Contact		**Contact** tpa007@shsu.edu	

Sam Houston
STATE UNIVERSITY
A Member of The Texas State University System

Initial Submission

Date: Nov 16, 2020 10:50:00 AM CST

TO: Temitope Agboola Danhong Chen
FROM: SHSU IRB
PROJECT TITLE: Understanding Factors Contributing to Household Food Insecurity
and Poverty Dynamics in Gert Sibanda District, Mpumalanga Province of South Africa
PROTOCOL #: IRB-2020-224
SUBMISSION TYPE: Initial
ACTION: Exempt
DECISION DATE: November 16, 2020
EXEMPT REVIEW CATEGORY: Category 2.(i). Research that only includes
interactions involving educational tests (cognitive, diagnostic, aptitude, achievement),
survey procedures, interview procedures, or observation of public behavior (including
visual or auditory recording).
The information obtained is recorded by the investigator in such a manner that the
identity of the human subjects cannot readily be ascertained, directly or through
identifiers linked to the subjects.

**REVISED SPECIAL UPDATE RE: COVID-19 CRISIS: The IRB has released
specific guidelines for easing or transitioning existing IRB-approved studies or any
new study subject to IRB oversight to in-person data collection. Please be advised,
before ANY in-person data collection can begin, you must
have IRB approval specifically for the conduct of this type of research. Please see
the IRB response page for COVID-19 here.**

REVISED: ATTENTION RESEARCHERS! Effective Monday, July 27, 2020,
the IRB has revised its online office hours to 12-2 on Zoom Monday through Thursday.
These will be permanent office hours. To access Zoom during the IRB's office hours,
click here. Just in case, here is the meeting ID: 712-632-8951. **SEE YOU ON ZOOM
FROM 12-2 MONDAY-THURSDAY!**

Greetings,

Thank you for your submission of Initial Review materials for this project. The Sam
Houston State University (SHSU) IRB has determined this project is EXEMPT
FROM IRB REVIEW according to federal regulations.

**Since Cayuse IRB does not currently possess the ability to provide a "stamp
of approval" on any recruitment or consent documentation, it is the strong**

recommendation of this office to please include the following approval language in the footer of those recruitment and consent documents: IRB-2020-224/November 16, 2020.

We will retain a copy of this correspondence within our records.

* What should investigators do when considering changes to an exempt study that could make it nonexempt?

It is the PI's responsibility to consult with the IRB whenever questions arise about whether planned changes to an exempt study might make that study nonexempt human subjects research.

In this case, please make available sufficient information to the IRB so it can make a correct determination.

If you have any questions, please contact the IRB Office at 936-294-4875 or irb@shsu.edu. Please include your project title and protocol number in all correspondence with this committee.

Sincerely,

Chase Young, Ph.D.
Chair, IRB
Hannah R. Gerber, Ph.D.

VITA

Name   **Agboola Peter Temitope**

Institution Address: Sam Houston State University, School of Agricultural Science, Huntsville Texas.

Nationality   Nigerian

Employment History

Date of duty assumption	*January 2021 -July 2021*
Name and Address of employer	Sam Houston State University, Huntsville. Texas. School of Agricultural Science,
Position held	Agricultural Internship. (Not Paid)
Main activities and responsibilities	Develop research plan, develop research instrument, collect data, analyze data, Publish result in a reputable manuscript.

Date of duty assumption	*June 2013 – December 2018*
Name and Address of employer	University of South Africa, Department of Agriculture and Animal health
Type of Institution	Academic Institution
Position held	Lecturer/Facilitator.
Main activities and responsibilities	Facilitation of learning, Manage student's earning experiences online, Sets assignments and examination papers (formative, as well summative assessment) for extend (foundation) modules, Assesses foundation students `s assignments and examination papers, Moderates tutor

implemented assessment, Conducts discussion classes, group visits and lectures for foundation students, Implement formative assessment, Facilitate student's interactions with their peers online, Provide students with academic and technical support online

Education and Training

Date	**January 2019 – July 2021**
Name of the Institution	Sam Houston State University. School of Agricultural Science
Title of Qualification	MSc (Agricultural Science)

- **Thesis Title**: Understanding Food Insecurity and Poverty Dynamics in Gert Sibande Municipality of Mpumalanga Province. South Africa

Date	**2013 - 2016**
Name of the Institution	University of South Africa
Principal subject	Agricultural Economics
Title of Qualification	M.Sc. (Agricultural Science) *(Cum Laude)*

Dissertation Title Submitted: Assessment of Welfare Shocks and Food Insecurity in Ephraim Mogale and Greater Tubatse Municipality of Sekhukhune District. Limpopo province. South Africa.

Date	**2003 - 2008**
Name of the Institution	Ladoke Akintola University of Technology, Department of Agricultural Economics and Extension.
Principal Field	Agricultural Economics and Extension

Title of Qualification   B. Tech. (Hons) Agric. Economics and Extension

Areas of Expertise

- Data collection and management
- Data analysis
- Proposal development & delivery
- Project impact communication
- Research paper writing & editorial skills
- Secondary data utilization
- Project initiation and appraisal
- Gender analysis

- Teaching, training and capacity building
- Output/ impact communication
- Knowledge creation, management and application
- Leadership role
- Team bonding and good collaboration
- Strategic, critical and deep thinking, problem solving

Computer Knowledge and Software skills

1. Ability to use Microsoft word, Excel, Power point, Note pad etc.

2. Ability to proficiently use software like STATA, SPSS.

3. Ability to handle, analyze and interpret complex data, before presenting it back based on the overall analysis made.

4. Advanced problem solving and numeracy skills.

5. Advanced research and academic writing skill

6. Accomplished communication skills, both written and verbal, developed through numerous essays and presentations.

Certifications

Extension Disaster Education Network (EDEN)   (2019)

Animal Agro security Emergency management

Professional Membership

1. Member-The Agricultural Economics Association of South Africa (AEASA), South Africa

2.   Member of Agricultural and Applied Economics Association (AAEA)

3.   Member of Western Agricultural Economics Association (WAEA)

3.   Member - South African Society for Agricultural Extension (SASAE), South Africa

4.   Professional Scientist- South African Council for Natural Scientific Professions (SACNASP), South Africa