

ANALYSING THE EFFECT OF COVID-19 INDUCED RESTRICTIONS ON RURAL
HOUSEHOLD'S FOOD SECURITY: A CASE OF MAKHADO LOCAL MUNICIPALITY,
LIMPOPO PROVINCE

BY

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ABSTRACT

The country witnessed a major global economic slowdown and increasing disruption to food supply chains due to the lockdown caused by COVID-19, a global health crisis. The COVID-19 crisis has negatively affected agri-food enterprises' ability to ensure consistent supplies of food to markets due to forced closures, labour shortages caused by illness, and a decline in operations caused by physical separation and lockdowns. Understanding the effects of COVID-19 on household food security is critical given the need to improve food security, especially at household and individual levels.

Given the background information, the study aimed at analysing how COVID-19 induced restrictions have affected rural household food security in Makhado Local Municipality of Limpopo Province. The study was conducted in the Limpopo Province of South Africa, at Makhado Local Municipality. The Municipality comprises four administrative areas, namely, Louis Trichardt, Vleifontein, Waterval, and Dzanani. The sampling procedures employed for the study were purposive sampling and proportional random sampling. Primary data were collected from the 139 randomly selected households using a structured questionnaire with household heads as the unit of analysis. Household Food Insecurity Access Scale (HFIAS), Household Dietary Diversity Score (HDDS) and Multiple Linear Regression Model were used to analyse the effect of COVID-19 induced restrictions on household food security.

Based on the results, the study concluded that, food insecurity increased among Makahado local municipality rural households during the COVID-19 pandemic, and the households were concerned about not having enough food. The COVID-19 pandemic robbed the people of their constitutionally protected right to sufficient food, weakening efforts to achieve "Zero Hunger" by 2030 under the National Development Plan and the United Nations Sustainable Development Goals. Furthermore, the results revealed a significant unemployment rate and low-income status rate, as most members of the households depended on social grants for income, severely limiting the extent of household food security. According to the findings of the study, employment is an important factor in ensuring household food security. Remittances have been discovered to be a critical tool for many households in the research area, and increased concentrations of remittances can significantly alleviate food insecurity and the implications of income inequality. Policymakers in emerging economies can

focus on ensuring job security to mitigate the negative effects of income inequality while lowering remittance transaction costs.

The study, therefore, recommends that the government solves this problem by enacting appropriate policies and allocating subsidies to lower-income deciles, allowing essential food items such as protein and micronutrient sources to enter people's food baskets. More emphasis should be placed on the implementation of feeding schemes to decrease the burden on the poor while also making it easier for youths to attend school. All innovation stakeholders, including rural recipients, must be involved in every step of improving rural livelihoods. A thriving and dynamic agricultural sector is a critical pillar of rural development, generating strong ties to other aspects of the economy. Rural livelihoods are improved when rural communities and individuals actively participate in the management of their own social, economic, and environmental affairs.

Keywords: Lockdown, Household Food Insecurity Access Scale (HFIAS), Household Dietary Diversity Score (HDDS), Induced restriction, Food in(security).

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DECLARATION

I, Thivhulawi Nevhutalu, declare that the dissertation “Analysing *the effect of COVID-19 induced restrictions on rural household’s food security: a case of Makhado local municipality, Limpopo province*” is my own work, and has not previously been submitted for any degree to any other university, moreover, all the sources used have been indicated, cited, and acknowledged in complete references.

Surname & Initials.....

Date.....

DEDICATION

I would like to dedicate this study to my parents and siblings. The study is also dedicated to all the households of Makhado local municipality who participated in this study.

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LIST OF ABBREVIATIONS

AHA	American Heart Association
CASP	Comprehensive Agricultural Support Programme
CFR	Child Foster Fund
CRDP	The Comprehensive Rural Development Programme
CRF	COVID-19 Relief Funds
CSG	Child Social Grant
CSI	Coping Strategy Index
DAFF	Department of Agriculture, Forestry and Fisheries
DARDLR	Department of Agriculture, Land Reform and Rural Development
DFISA	Development Finance Institution of South Africa
EDD	Economic Development Department
FAO	Food and Agricultural Organization
FANTA	Food and Nutrition Technical Assistance
GHS	General Household Survey
HDDS	Household Dietary Diversity Score
HFIAS	Household Food Insecurity Access Scale
HSRC	Human Science Research Council
IFP	International Food Prices
IFPRI	International Food Policy Research Institute
IFSS	Integrated Food Security Strategy
INP	Integrated Nutrition Program
ODPHP	Office of Disease Prevention and Health Promotion

MAFISA	Micro Agricultural Finance Initiatives of South Africa
NDA	National Development Agency
NDA	National Department of Agriculture
NGP	National Growth Plan
NPC	National Planning Commission
NRC	National Research Council
NRF	National Research Foundation
NSFAS	National Students Financial Aid Scheme
PMBEDJD	Pietermaritzburg Economic Justice and Dignity
RSA	Republic of South Africa
SASSA	South African Social Security Agency
SDGs	Sustainable Development Goals
STATS SA	Statistics South Africa
UNICEF	United Nations International Children's Emergency Fund
WFP	World Food Program
WHO	World Health Organisation

CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND INFORMATION

In early December 2019, the outbreak of COVID-19, a new form of severe respiratory syndrome, began in Wuhan, Hubei Province, China (Harapan *et al.*, 2020). The COVID-19 pandemic has been declared a world health emergency by the World Health Organization (WHO) since the virus rapidly and extensively spread around the world from December 2019 (Harapan *et al.*, 2020). The first incident of COVID-19 was discovered on December 1, 2019, and the cause was a then-new coronavirus later identified as SARS-CoV-2. SARS-CoV-2 may have begun in an animal and evolved (mutated) to cause illness in humans (Huang *et al.*, 2020). According to (Nxumalo, 2020), COVID-19 can be fatal, causing millions of deaths worldwide as well as long-term health problems in those who survive the illness. Symptoms appear to individuals two to 14 days after exposure to the virus. A person infected with the coronavirus is infectious to others for as little as two days before symptoms appear and 10 to 20 days after symptoms become apparent, depending on their immune system and the severity of their illness (Jin *et al.*, 2020).

COVID-19 (Coronavirus) has had an impact on daily life and is slowing down the world's economy. Since WHO declared COVID-19 a pandemic, global pandemic preparedness has been vastly improved. To mitigate the impact of COVID-19, South African authorities implemented physical separation, isolation from others, the shutdown of services that were not essential, schools, travel restrictions, and recursive national lockdowns (Haleem *et al.*, 2020). The COVID-19 pandemic threatens food access primarily through income and asset losses that limit one's ability to purchase food (Klassen and Murphy, 2020; Clapp and Moseley, 2020; Laborde *et al.*, 2020). For example, the poorest households in African countries spend approximately 70% of their income on food and have limited access to financial markets, making their food security highly vulnerable to income shocks (Labordorios *et al.*, 2020).

Food security is defined by the Food and Agricultural Organization as a state in which all people have physical, social, and economic access to sufficient, safe, and nutritious food that always meets their dietary needs and food preferences for an active and healthy life (FAO, 2009). A society that can be said to have food security is the one that has not only reached a food standard but has also developed internal structures

that will allow it to lower the achieved level of food consumption (Devereux *et al.*, 2008). Food insecurity has both a short-term and long-term dimension. Short-term food insecurity refers to a temporary decrease in a household's access to adequate food (Labadarios *et al.*, 2011). This could happen because of the fluctuations in food prices, household income, and domestic production. In addition, where there is severe short-term food security, households become susceptible to food famine. Chronic food insecurity is defined as a persistently insufficient diet caused by the household's inability to obtain adequate food (FAO, 2016).

At the national level, South Africa is confronted with a wide range of food security issues, including high levels of poverty, unemployment, insufficient safety nets, and unsatisfactory household food production (Stats SA, 2019). For example, poverty-stricken families are unable to purchase food due to a lack of funds (Shisanya *et al.*, 2014). In relation to this, the ongoing pandemic has had a serious effect on the entire food chain, exposing its vulnerability. Consequently, farmers and agricultural workers have been unable to access markets, including markets to acquire inputs and sell their goods (FAO, 2021). This was also triggered by border closures, trade restrictions, and confinement measures, disrupting domestic and international food supply chains and limiting access to nutritious, safe, and diverse meals (FAO, 2021). Following the closure of open-air markets and a ban on street vendors, poor consumers were indirectly forced to shift to more expensive food outlets such as supermarkets, which further disrupted household food access and diet quality (FAO, 2021). Furthermore, Stephen *et al.* (2020) states that in the medium term, one or more household members' eating patterns were be disrupted, and food intake reduced because the household lacked money and other food resources. This frequently results in a sustained reduction in access to preferred foods and a shift to cheaper, less nutritious foods, which worsens nutrition status.).

With the made projections, the COVID-19 pandemic is expected to have significantly increased the number of people experiencing acute food insecurity between 2020/2021 (World Health Organisation [WHO], 2020). On the other hand, the World Food Program (WFP) estimates that approximately 272 million people in the countries where it operates are food insecure or at the danger of becoming food insecure, including countries such as Malawi, Indonesia, Ghana, South Sudan, and South Africa. There are already multiple signs that these numbers could drastically rise if

early efforts to save lives and restore livelihoods are not implemented (WFP, 2020). At the country level, the World Bank Group is collaborating with governments and international partners to closely monitor domestic food and agricultural supply chains, track how job and income loss affect people's ability to purchase food, and ensure that food systems continue to function despite COVID-19 challenges (United Nations, 2020).

In the light of the above information, it is very clear that all aspects of the crisis' food security and nutrition requires attention. For instance, to address the COVID-19 pandemic and its effects on food security, countries must collaborate across sectors and borders to limit immediate effects and redesign food systems to encourage healthy diets for all people and to do more to connect food production and consumption with sustainable development (Human Science Research Council [HSRC], 2021). The COVID-19 response plans should also devise immediate interventions to protect and improve rural livelihoods while also planning for a more inclusive, ecologically responsible, and resilient food system in the future.

Again, there are many threats to food security at the country level and these threats includes retail prices, along with lower incomes. Thus, forcing an increasing number of households to reduce the quantity and quality of their food consumption (World Bank, 2020). In addition, the food price inflation is substantial at the retail level in many nations, indicating ongoing supply disruptions caused by COVID-19 social distancing measures, currency devaluations, to mention a few. For example, people in low- and middle-income nations are more affected by rising food prices because they spend a bigger portion of their income on food than people in high-income countries (FAO, 2020). The pandemic has impacted the whole food chain, exposing its vulnerability. The pandemic has devastated jobs and threatened the livelihoods of millions of people living in rural areas. As breadwinners lose their jobs, become ill, or die, the food security and nutrition of millions of women and men are jeopardized, particularly in low-income countries such as South Africa, where the most marginalized populations, such as small-scale farmers and indigenous peoples, are hardest struck. Therefore, the food and dietary support should be at the core of social protection services to protect food availability for the most vulnerable by enhancing their purchasing power and, if necessary, directly distributing food through government or community-based programmes.

1.2 PROBLEM STATEMENT

The COVID-19 is a respiratory infection, and there is no indication that it is spread by food (Ghebreyesus, 2020). However, the virus' spread and the steps taken to stop it have had far-reaching consequences for food security, safety, and food systems (Khorsandi, 2020). This is because food security in the home increases both the availability, utilisation, accessibility, and stability of food, including the buying power of the household when food is not provided. Individual members of a household may be malnourished while others have plenty to eat (FAO, 2020). Furthermore, the food supplies may be sufficient at the national level, but due to the production and supply shortages, lack of access to those supplies and low-income levels household food insecurity may still exist. It has been mentioned by the Food and Agricultural Organisation that food insecurity has remained a major issue throughout the world. This is because the large number of the world's population suffers from hunger and vulnerability due to insufficient means to obtain the exact amount of nutritious food (FAO, 2020).

The country witnessed a major global economic slowdown and increasing disruption to food supply chains due to the lockdown caused by COVID-19, a global health crisis (FAO *et al.*, 2020). The COVID-19 crisis has negatively affected agri-food enterprises' ability to ensure consistent supplies of food to markets due to forced closures, labour shortages caused by illness, and a decline in operations caused by physical separation and lockdowns (FAO, 2020). Furthermore, the COVID-19 pandemic persists, has disrupted food supplies and poses a threat to food security, especially among vulnerable groups such as people over the age of 60 years as well as those people who suffer from lung and heart disease (Ou, Wu, Yang, Tan, Zhang and Gu, 2020). Beltrami (2020) states that transportation and people movement restrictions have also resulted in some food logistics challenges across continents. Food insecurity becomes a major source of concern and potential policy intervention when it worsens to the point of nutritional deficiencies, increased hunger, and poverty (Shan and Zhang, 2020).

In addition, COVID-19 restrictions also negatively impacted households' livelihoods, not only in rural areas, but also in urban areas of the Makhado Local Municipality (MLM). This is because the state government of South Africa implemented lockdown measures and movement restrictions; thus, limiting employment opportunities. The

lockdown measures have reduced both informal and formal trade within the municipality's borders. Again, allocations from government programmes or other households, subsistence farming, and the market are the three main sources of food for poor households in South Africa, including MLM (Department of Agriculture, Land Reform and Rural Development, 2019). This is because, the families in rural areas are more likely to grow their own food, whereas urban households are more likely to buy food. However, several studies have found that households in both rural and urban regions around the globe are becoming more self-sufficient in terms of market purchases, with about 90% of their food supply coming from the market (Baiphethi and Jacobs, 2019). Regardless, the combination of household income loss and food price increases has exacerbated the population-facing food shortage crisis (Africa Centre for Strategic Studies, 2020). Similarly, Altman *et al.* (2009) previously argued that the huge percentage of households in the Limpopo Province is food insecure, thus highlighting that there is little certainty about the status of food security among the households during the COVID-19 pandemic in the province. Therefore, the need to analyse the effects of COVID-19 induced restriction on household food security is imperative, particularly considering the World Health Organization's prediction in 2020 that the worst effects are yet to come about food security, especially in the African continent. Furthermore, most health experts predict that this virus will continue to circulate for at least another year or two in 2021 and 2022 (Scudellari, 2020). This means that many households are also susceptible to suffer from food insecurity shocks (Ghebreyesus, 2020; Khorsandi, 2020).

Understanding the effects of COVID-19 on household food security is critical, given the need to improve food security, especially at household and individual levels. Significant portions of the country's population are still facing food insecurity. However, there is little information available on how COVID-19 restrictions affect food security in rural households. While aggregate data are typically gathered and available at the national level, little research has been conducted to investigate the impact of the Corona Virus on rural food security issues at the household level in individual locations/districts. Having national food balance data is insufficient to comprehend the impact of COVID-19 induced restrictions on the country's food security dynamics. Despite the growing worldwide concern about enhancing food security because of the pandemic of COVID-19, the nature and degree of food security at the household level

in rural regions is little researched. Therefore, this study sought to analyse the effects of COVID-19 induced restrictions on household food security levels at MLM.

1.3 SCOPE OF THE STUDY

1.3.1 Aim

The aim of the study is to analyse how COVID-19 induced restrictions have affected rural household food security in the Makhado Local Municipality of Limpopo Province.

1.3.2 OBJECTIVES

The objectives of the study were:

- i. to identify and describe socio-economic characteristics of rural households at MLM.
- ii. to examine and characterise food security status of rural households at MLM.
- iii. To investigate the coping strategies used by households to obtain food amid the induced restrictions at MLM.
- iv. to assess the effects of COVID-19 on rural household food security at MLM.

1.3.3 HYPOTHESES

- i. Socio-economic characteristics do not influence household food security.
- ii. There are no effects of induced COVID-19 restrictions at MLM.

1.4 RATIONALE OF THE STUDY

There is food security at the national level in South Africa (Crush and Si, 2020). However, food security is not the same at the provincial level, especially in the Limpopo Province (Oluwatayo, 2019; Raidimi and Kabiti, 2019). The topic of food consumption is extremely relevant in South Africa, given its link to hardship and poverty (Raidimi and Kabiti, 2019). One of the primary goals of social welfare policy in South Africa is poverty alleviation (Kon and Lackan, 2018). South Africa's Constitution recognises poverty and, as such, includes a section on social security. Section 27(1)(c) of the South African Constitution states that everyone has the right to social security, including if they are unable to support themselves and their dependents (RSA, 2017).

The first incidence of COVID-19 in South Africa was recorded on March 1, 2020, in KwaZulu-Natal, and it quickly spread to practically all provinces. (NICD, 2020). As a result, the government instituted stringent restrictions such as lockdowns, locked

borders, and social exclusion. These policies, which were in accordance with World Health Organization (WHO) principles, had a significant influence on South Africa's economic structures and the food security situation of millions of people. (Crush and Si, 2020). While the COVID-19 pandemic has hampered national progress toward the Sustainable Development Goal 2 (SDG2) of reaching zero hunger by 2030, its ramifications at the individual and family levels have not been well researched and are little understood. (Mohamed et al., 2021).

COVID-19 relief measures at the global level do not guarantee national-level relief measures. Furthermore, efforts at the national level do not ensure food security at the household or individual level. Until recently, the rural population dominated South Africa's economy. (Steyn and Klopper, 2020). Undernourishment and malnutrition are widespread in rural South Africa, and a significant percentage of rural households live in extreme poverty. Furthermore, the key features of South Africa's rural families now are a lack of means of production and a large family size (the majority of whom are dependents). According to a more recent IPC (2021) assessment, 8.18 million people in South Africa were in crisis and 1.16 million were in a state of emergency due to food insecurity in December 2020, with forecasts of 9.60 million and 2.20 million by March 2021, respectively. Economic collapse and unemployment, food costs, drought, and the COVID-19 pandemic were the primary factors of this surge in food poverty. (IPC, 2021). As a result, many South Africans have been left with little money, leading in food shortages and, eventually, food insecurity in their families. This is because income has a crucial role in influencing a household's food security status. (Manyamba et al., 2020). Furthermore, many rural households rely on access to cash, either directly as received cash after a piece job or indirectly as net income or loss from spending items. These individuals do not farm their basic foods and instead acquire them from commercial sources (IPC, 2021). As a result, many academics, political leaders, and other professionals are concerned about the issue of food insecurity induced by COVID-19. This is one of the first studies to analyse the impact of COVID-19-induced food security limits in Limpopo Province, as well as the short-term repercussions of the COVID-19 pandemic on rural households' food security in Makhado local municipality. Furthermore, the research suggestions will help design government activities in the municipality in response to the pandemic. The research has four goals. First, it identifies and describes the socioeconomic characteristics of

rural households in MLM; second, it examines and characterizes the food security status of rural households in MLM; third, it investigates the coping strategies employed by households to obtain food in the face of induced restrictions in MLM; and finally, it evaluates the effects of COVID-19 on rural household food security in MLM.

1.5 OUTLINE OF THE STUDY

The study is divided into five chapters. The first chapter consists of the introduction with the background information, a problem statement; rationale of the study, aim and objectives and the research hypotheses of the study. The second chapter is the literature review, which includes a review of prior studies on food security undertaken by researchers. The research methodology is outlined in chapter three, which comprises the study area, data sources, sample procedures, and analytical tools. The outcomes of the data collection and the analysis of the data obtained in the study are presented in chapter four. The summary, conclusion, and recommendations based on the study's findings are presented in chapter five.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

The literature review chapter is where the researcher goes over the previous studies in relation to the subject under investigation. This chapter reviews studies from a variety of sources regarding the effects of COVID-19 on food security in South Africa and other countries. This chapter also gives an overview of the state of food security in South Africa and other countries.

2.1 DEFINITION OF CONCEPTS

a. COVID-19

The coronavirus disease 2019 (COVID-19) is a human-to-human communicable respiratory disease caused by a new coronavirus strain. Several coronaviruses have been associated with the respiratory infections in humans, ranging from the common cold to more serious illnesses like Middle East Respiratory Syndrome (WHO, 2020).

b. Food security

In the context of the study, food security is described as all South Africans having physical, social, and economic access to sufficient, safe, and nutritious food always to fulfil their dietary and food preferences to live an active and healthy life (NDA, 2002).

c. Rural Household

A household is mainly composed of one or more people who live in the same house and eat together. Rural households engage in farming, labour, and migration, but one of these activities usually dominates as a source of income and has the potential to play the primary role in conserving and protecting land, water, and forests (FAO, 2018).

2.2 The Concept of food (in) security

Food security received a lot of attention in South Africa after it became a democratic country in 1994. The right to adequate food was embedded in Sections 26 and 27 of the 1996 South African Constitution. According to the Constitution, every South African citizen has a right to adequate food and water, as well as social security (Department of Water and Sanitation, 2015). Therefore, food security was foregrounded as one of the top priorities by the South African government in the 2010/2011 fiscal year (State

of Nation Address, 2010). According to Gross *et al.* (2010), food security is achieved when adequate food (quantity, quality, safety, and socio-cultural acceptability) is available and accessible for and satisfactorily always utilised by all individuals to live a healthy and a happy life. In addition, food insecurity occurs when one or more of the four elements are weakened and can have an impact at the national, household, and individual levels. Food insecurity has both a short-term and long-term component. In a detailed manner, a temporary decrease in a household's access to adequate food is referred to as short-term food insecurity. This could occur because of the changes in food prices, household income, and domestic production. In the most extreme cases, it results in famine. Chronic food insecurity is defined as a persistently inadequate diet caused by a household's inability to obtain adequate food. Inconsistent access to healthy food has a negative impact on health. Food insecurity and poor nutrition; for example, can lead to obesity, which is a major risk factor for heart disease, stroke, high blood pressure, diabetes, and many cancers (American Heart Association, 2021).

Food insecurity has become the standard practice for low-income and unemployed people. Unfortunately, most of the population is unable to produce food for their own consumption. Broad-based agricultural development is the primary path to long-term food security (FAO, 2019). This is evidenced further by WHO (2020), on a note that people can only fully benefit from new opportunities if they are healthy and well-nourished. Having enough food is only one component of the solution; adequate food supplies must be linked to improved health care, nutrition education, and safe water supplies. It is further indicated by Jacobs (2009) that as a result, households are compelled to purchase their staple foods from commercial suppliers, who are reliant on access to cash money. Research done by Coleman-Jensen *et al.* (2019) has revealed that, food insecurity is a complex issue. This is because many people lack resources to meet their basic needs, putting their families at the risk of food insecurity. Although food insecurity is closely related to poverty, not all people living below the poverty line experience it, and people living above the poverty line can also experience food insecurity.

2.3 Pillars of food security

Food security, according to FAO (2016), is dependent on food availability, access to food, food utilisation and food stability. These key elements of food security are referred to as the pillars of food security. Khan and Gill (2009) mention that food availability occurs when enough food is always available to a household and all members of that household. As a result, a household that lacks sufficient food is classified as food insecure and becomes more vulnerable to hunger and malnutrition.

Food access is influenced by factors such as physical and financial resources, as well as social and political factors (Ziervogel *et al.*, 2006). Food access also implies increasing individual and household purchasing power to purchase adequate and high-quality food from the market. Adequate income or other resources, such as assets, are required to afford market food prices. With the given information, food accessibility refers to improving physical access through infrastructure (e.g., roads) and marketing in areas prone to food insecurity (Stats SA, 2017). For example, individuals and households should be able to select, store, prepare, distribute, and eat food in ways that ensure adequate nutritional absorption for all household members (FAO, 2019). Food stability refers to the temporal dimension of food and nutrition security, or the timeframe in which food and nutrition security is considered. Food stability is achieved when the supply at the household level remains constant over the course of the year and over the long term. This includes food, income, and financial resources. In other words, food insecurity exists when these components are absent. Nutritional absorption is influenced by the availability of safe water, sanitation, refrigeration, and health care services. Therefore, food security can be achieved when all four components of food security are realised at the national and household levels and these components are, food availability, food access, food utilisation, and food stability.

2.4 Overview of food security in the world

According to FAO (2015), over 855 million people worldwide are classified as acutely malnourished due to the presence of food insecurity. This food situation is acute and changes on a regular basis because of imbalances caused by issues related to food scarcity, affordability, and accessibility. The FAO (2017) and FAO (2018) further emphasised that, the number of people without food continues to be high, particularly

in developing countries, accounting for 98% of the food insecure population. In addition, malnutrition occurs when an individual's nutrition falls below the bare minimum of food energy. According to Machete (2004), food insecure people are found in rural areas, with 75% of such people being chronically poor. It has been documented that the prevalence of hunger and malnutrition in South Africa is due to insufficient access to food by certain groups of individuals and households in the population, rather than the lack of food. A similar sentiment was earlier shared by Arene and Anyaeji (2010) stating that, there is enough food production globally, but about one billion people go hungry because they cannot afford food or cannot access food supplies due to rising food prices. Under the shadow of the COVID-19 pandemic, the number of people suffering from hunger worldwide increased in 2020. It was estimated that between 720 and 811 million people were hungry in the world by 2020. There were 118 million more people facing hunger in 2020 than in 2019 (FAO, 2020). Furthermore, due to the long-term effects of COVID-19 on global food security, it is estimated that approximately 660 million people will still face hunger in 2030, 30 million more than in a scenario in which the pandemic did not occur (WHO, 2020).

The setback makes achieving the Sustainable Development Goals of achieving zero hunger and ending all forms of malnutrition more difficult. According to the State of Food Security and Nutrition in the World 2020 report, the most vulnerable population groups' food security and nutritional status are likely to deteriorate further because of the COVID-19 pandemic's health and socioeconomic impacts. The report advocates a food system transformation to lower the cost of nutritious foods and increase the affordability of healthy diets. Moreover, the pandemic came at a time when food security and food systems were already under strain. Conflict, natural disaster, climate change, and the arrival of pests and plagues on a transcontinental scale preceded COVID-19 and were already undermining food security in many contexts.

2.5 Overview of food security in South Africa

According to Hart (2009), South Africa has been declared food secure at the national level, but the same cannot be said of household food security. To close the food security gap, the country imports some food products to feed its rapidly growing population (FAO, 2008). The country has been shown to have met the food needs of most of the population nationally, but little is said about household food security, particularly in the rural parts of South Africa (Stats SA, 2019). The Office of Disease

Prevention and Health Promotion (ODPHP) states that, for low-income earners and the unemployed, food insecurity has become the standard of living in their household. Unfortunately, most of the population is unable to produce food for themselves. As a result, such populace is compelled to purchase their staple foods from commercial suppliers, who are reliant on cash money (Jacobs, 2009). Furthermore, when there is a shift in employment and salary source for such people, food becomes more expensive.

The low-income and unemployed people obtain funds through part-time work, government social welfare, safety nets (particularly in the form of child support grants and old-age pensions), and private money transfers from friends and family. This indicates that such individuals have limited buying power and therefore limited access to food. South African citizens' access to food is also limited by their direct connections to natural resources such as land on which they can produce food to sustain individuals and their households, along with availability of resources such as wild food, and the capabilities to rear crops and livestock (Stats SA, 2011). Alexandra (2010) goes on to say that food security has two components: the first is the availability of food and the ability to produce food through one's own production, and the second is having access to markets and the ability to purchase food items. As previously stated, South Africa is food secure at the national level because it produces staple foods and exports surplus food. The country has always imported what it requires to meet its food needs. The national food security figures indicate that South Africa has been achieving its population's food needs from local production for the past 25 years, that is from 1992 to 2017 (Stats SA, 2019). Examples include soup kitchens, food banks, school lunch programmes, and other programmes that give food to people in need without requiring any type of commitment in return. According to Van der Merwe (2011), policies that emphasise the achievement of adequate food security levels for all citizens in the country, rather than the production of adequate quantities of food through commercial farming alone, must be developed. Since 1994, the South African government has planned to increase public spending to improve household food security, primarily among the previously disadvantaged, through various legislation and policies. In general, South Africa's food security situation reflects the global picture in such a way that adequate aggregate food availability does not translate into adequate accessibility for all individuals.

Food insufficiency and hunger continue to be a problem in South Africa. This is because, poverty-stricken households do not have enough money to buy food and are unable to produce their own. These households are hampered by their inability to find work or generate income (Stats SA, 2019). It was mentioned by the Organisation for Economic Co-operation Development (2016) that poor households are also characterised by a small number of income earners and many dependents, making them particularly vulnerable to economic shocks. Although South Africa is considered food secure, food insecurity affects a sizable portion of the population's households. Therefore, several low-income households' face food insecurity (Gumede, 2010).

2.6 Overview of Food Security at Rural Household Level in South Africa

Most poor households are concentrated in rural areas, particularly in rural villages. Because most of the poor live in rural areas, it is possible that the households that are food insecure are in rural areas. Machete *et al.* (2004) support this view in their study, stating that food insecurity is more pervasive in rural areas. According to Altman *et al.* (2009), a huge percentage of households in South Africa is food insecure. This is supported by the study conducted by Infection Prevention and Control (2020), which indicates that in the period of September to December 2020, about 9.34 million South Africans (16% of the population studied) faced acute food insecurity, with 12% of rural households affected. The situation is related to higher poverty levels that take place in the country, mostly in the rural households (Abdu-Raheem and Worth, 2011).

Each household's food security can be classified into four levels, which are as follows: i) high food security (defined as the household having constant access to adequate food without difficulty or anxiety); ii) marginal food security (defined as the household having difficulty or anxiety about accessing adequate food at all times, but the quality, variety, and quantity of their food intake is not significantly reduced); iii) low food security (the efficiency and diversity of a person's food consumption are lowered, but the amounts of food consumed and normal eating habits are not significantly disrupted); and iv) very low food security (the amount of food consumed and normal eating patterns are disrupted at certain times of the year due to a lack of money and other resources to access food) (FAO, 2013).

Food affordability has an economic impact on household food insecurity. While households will choose food based on their personal preferences, they will also

choose food based on price, quality, and their available purchasing resources (Institute of Medicine [IOM] and National Research Council [NRC] 2013; Pollard *et al.*, 2014). In South Africa, household food insecurity is closely related to household socioeconomic status, as measured by income, employment status, and food expenditure (Chopra *et al.*, 2009). As a result, total household income is instrumental in ensuring food security (Shisanya and Hendriks, 2014; Hendriks, 2013), and with the high level of poverty, most South African households struggle to purchase enough food to sustain the entire household. The majority face challenges to achieve a steady income. In addition, the food poverty line has increased from R585 to R624 per person per month (+6.7%) (Stats SA, 2021). This is the amount of money required for an individual to afford the minimum daily energy intake.

Poor households are also characterised by a small number of income earners and many dependents, making them particularly vulnerable to economic shocks. Aside from household characteristics, food price could be a contributing factor to varying levels of food insecurity in rural areas. Wheat and maize prices, which are staple foods in South Africa, have recently risen in global markets (World Bank, 2018). This development exacerbates food insecurity by making it more difficult for households to obtain food items with their earnings. According to the World Bank (2018), landless and female-headed households, as well as the rural and urban poor, are the major groups most affected, and this situation is likely to persist over the next decade.

Agriculture is prevalent in South African rural areas and is widely recognised as a tool for alleviating food insecurity and providing a stable rural economy. Most of the rural population is involved in farming, particularly community and home gardens for basic survival; however, very few are involved in commercial farming (Jablonski *et al.*, 2017). This indicates that most rural residents do not see agriculture as a source of economic endorsement, including creation of jobs. According to Kraus *et al.* (2017), one of the reasons rural people do not commercialise their produce is that they are unable to produce enough to meet the market demand. Furthermore, government assistance is insufficient because free seeds provided by the Department of Agriculture and Rural Development are frequently inadequate; additionally, nearly half of the rural population does not receive seeds based on political issues (FAO *et al.*, 2019).

Access to sufficient food at the household level is increasingly reliant on the functioning of food markets and distribution systems rather than solely on total agro-food output (Maxwell and Smith, 2015). In addition, South Africa is dealing with structural household food insecurity, the primary causes of which are widespread chronic poverty and unemployment (HSRC, 2018). The problem of household food insecurity is further exacerbated by the spread of COVID-19 that has recently come into play and increase the cost of food due to hard lockdown measures that restricted trade of goods and services as well as travel. According to Abdullah *et al.* (2017), households in rural areas are the most vulnerable to food insecurity because they buy most of their food rather than growing it themselves.

2.7 The Effects of COVID-19 on Food Security from a Global Perspective

The coronavirus pandemic has triggered not only a health crisis, but also an economic crisis, both of which pose a serious threat to food security, food systems and nutrition, particularly in developing countries like South Africa (WHO, 2020a). Several factors such as physical distancing policies and hard lockdown posed a threat to food security during the pandemic. Such factors slowed economic activity and disrupted supply chains, triggering new dynamics with bubbling effects on food systems and people's food security and nutrition. Also, food availability, pricing, and quality were all impacted by the disruption of food supply chains during the lockdown period. Because of many countries' reliance on imports of essential food items such as wheat and rice, many African countries have become vulnerable because of restrictions on exports and imports of these items (HLPE, 2020a). Furthermore, the illnesses of food system workers played a significant role in the disruption of supply chains.

Amesho *et al.* (2020) mention that many people in Africa, particularly poor families, rely on social prevention programmes that were negatively impacted by the pandemic. For example, schoolchildren lost their meals because of school closures caused by interruptions in social protection programmes. Feeding programmes, childcare grants, free medical care for children and expectant mothers, pension funds, regional public works schemes, and community food programmes were all applied to enhance household food security (FAO, 2019).

The pandemic has caused damage in the entire food system, exposing its vulnerability. Border closings, restrictions on trade, and isolation measures have made

it difficult for farmers to access markets, including their ability to buy inputs and sell their produce, and for agricultural workers to harvest crops, disrupting domestic and international food supply chains and reducing access to healthy, safe, and diverse diets (International Labour Organisation, 2020). Many countries are increasingly experiencing increasing acute food insecurity, reversing years of development progress. The World Bank (2019) argues that, even before COVID-19 decreased incomes and disrupted supply chains, chronic and acute hunger were on the rise due to a variety of factors such as conflict, socioeconomic conditions, natural disasters, climate change, and pests. COVID-19's effects resulted in severe and widespread increases in global food insecurity, affecting vulnerable households in nearly every country, with effects expected to last into 2022 and possibly beyond (FAO, 2020).

2.8 The Effects of COVID-19 on Food Security from a South African Perspective

While the COVID-19 crisis continues to have a significant negative impact on South African food security, it is critical to remember that food scarcity existed prior to the crisis (Davies *et al.*, 2020). Furthermore, the crisis is exacerbating existing problems in South Africa, such as severe poverty, poor infrastructure, insufficient investment and resources, skill and knowledge deficiencies, and ineffective food and agriculture policies (Davies *et al.*, 2020). Furthermore, it emphasises the importance of strengthening Africa's agricultural and food manufacturing industries to reduce reliance on food imports from outside the continent.

Béné (2020) indicates that, because of supply chain disruption and falling consumer demand, farmers have been burying perishable produce or dumping milk. South Africa's distancing policies impose significant economic costs and have a negative impact on income factor distribution (Hidrobo *et al.*, 2018). For example, labour with a low level of education is much more severely affected than labour with a secondary or tertiary education. According to Arndt (2020), as a result, households with low levels of educational attainment and a high reliance on labour income are likely to face a massive real income shock, further risking their food security.

Despite significant investments in social protection, food insecurity and household and child hunger persisted. Also, given the pandemic's protracted nature and slow economic recovery, it was concluded that household and child hunger have stabilised at higher levels than before the pandemic (WHO, 2020). The phasing out of

emergency relief, combined with South Africa's constrained economic situation, are some of the reasons why food insecurity and hunger are likely to remain high in the near future (Chan *et al.*, 2020). The COVID-19 pandemic also highlights the critical need to transform the country's food systems. The FAO (2021) states that food systems continue to be a global driver of climate change and the planet's unfolding environmental crisis. This is because food systems account for nearly a third of all greenhouse gas emissions and have resulted in significant biodiversity loss. There is an urgent need to reconsider how the country produces, processes, markets, consumes, and disposes of food (IFPRI, 2021). The results of COVID-19 Waves 3, 4, and 5 indicate that hunger and food insecurity in South Africa have permanently increased in comparison to pre-2020 levels. Many people were lifted out of food insecurity because of the COVID-19 Relief Funds (CRF) and COVID-19 Social Grants (CSR) (FAO, 2021; Chan *et al.*, 2020). The CSG and CFR have been extremely beneficial, as have the grant top-ups. Although the smaller grants, even when supplemented, were insufficient to keep households above the food poverty line, they did alleviate poverty (FAO, 2021).

2.9 Literature Review on Household Food Security Determinants

2.9.1 Gender

To ensure everyone in the household and the society has access to adequate nourishment, women and men have separate and complementary tasks and responsibilities (Carter *et al.*, 2010). According to Carter *et al.* (2010), female-headed households experience more instances of food insecurity than male-headed households. This is because women are more likely to care for their extended families and will typically sacrifice their own food consumption to feed other household members. In addition to being frequently in charge of processing and cooking food for their households, women frequently have a greater role in assuring nutrition, food safety, and quality. Furthermore, women typically spend a significant portion of their monetary salary on household food needs (FAO, 2010b). According to Doss (2010)'s analysis of male and female households, there is a substantial positive association between the household head and food security. Food security is observed to be higher in male-headed households than in female-headed households. The expected odd gender ratio of 2.64 was discovered, meaning that male-headed households are 2.6 times more likely to be food secure than female-headed households. A similar study

was conducted in Brazil by Felker-Kantor and Wood (2012), with a particular emphasis on food insecurity and households headed by women. The study observed that, households headed by women are more likely to experience food insecurity than households headed by men. This could be explained by cultural factors that limit women's ability to earn additional income or participate in farming to reduce food insecurity in rural areas. According to Harris-Fry *et al.*, (2015), there are social and legal barriers that prevent women from owning or inheriting land, water rights, or livestock, borrowing money, or making decisions about household assets. As a result, their ability to manage food production and food security suffers both directly and negatively.

Women farmers are particularly at risk of starvation because there are still significant gender differences in agriculture, especially during times of crisis (Mallick and Rafi, 2010). In developing nations, rural women typically make up close to half of the agricultural workforce (Carter *et al.*, 2010). Despite playing vital roles in ensuring the safety of the food in households, they are discriminated against and have little negotiating leverage (Mason *et al.*, 2015). In many developing countries, land is traditionally owned by men and passed down through the generations. As a result, women might not have access to land, water, or livestock (FAO, 2013). Additionally, even when women have access to land, the lack of ownership diminishes their likelihood of investing time and resources in sustainable agricultural practices, which lowers production and lowers household income and food supply (FAO, 2013).

2.9.2 Age of the household head

An important element in the family's decision-making is the head of household's age (Downs and Demmler, 2020). In addition, research has revealed a connection between farm food production and the age of the family head. Compared to younger age groups, age reduces food production and negatively impacts household food security (Bashir *et al.*, 2012). According to a study conducted in Nigeria (Omonona and Agoi, 2007), households with an older head of a home had a higher prevalence of food insecurity than households with a younger head of a household. Families with household heads over the age of 60 are more likely to experience food insecurity since, at that age, household heads are typically retired. Since most of these households rely on social grants as their only source of income, most of them are characterised by large household sizes and low incomes (Omonona and Agoi, 2007).

According to Allen and De Brauw (2018), an aging population has an impact on the food production and supply chain since the elderly are unable to actively participate in off-farm work activities that provide money for the household. Young people are anticipated to actively participate in large-scale food production and take on occupations in addition to farming, which will boost household income and the state of food security (Cecchini *et al.*, 2018).

2.9.3 Household size

The likelihood of high food insecurity in the household also increases with household size. For instance, larger household sizes imply more stomachs to feed and a larger monthly budget, resulting in increased food insecurity (FAO, 2018). Maziya *et al.*, (2017) reported similar findings, arguing that having more people to feed on a fixed income may increase food insecurity (this would reduce expenditure per person, income per head, and per-capita food consumption). This was also highlighted by Sekhampu (2013), who claimed that as household size increases, so does the budget and demand for food as well as household resources. In comparison to households with a small family size, households with a big family size place an additional load on food consumption and are more likely to face food insecurity (Maziya *et al.*, 2017). The makeup of the household, including the number of members, each member's gender, and age, determine how much food is consumed, how it is distributed, and how well the home is able to meet its nutritional demands (FAO,2018). Large families therefore frequently compete for the few resources that are available in the home. Large households frequently eat fewer meals more frequently or in less quantities as a tactic, regardless of the quality of their food. The burden of providing food for the household's active members rises if most of its members are not productive workers, which raises the risk that there will be food insecurity (Maziya *et al.*, 2017).

2.9.4 Education

According to Bashir *et al.*, (2012), there is a correlation between the household head's educational attainment and food security, implying that the likelihood of food security in the home decreases with decreasing educational attainment. Education not only increases household income and access to food, but also widens employment prospects (Mutisya, 2016). Additionally, education encourages farmers to use new agricultural technologies, apply fertilizer correctly, and engage in other income-generating activities, all of which improve household food security. The growth of

human capital depends on education as well. People who have had some academic backgrounds are better able to absorb and comprehend the lessons presented during training programmes. Because of how easily technologies may be adapted, having a skilled person is crucial for implementation (Darling-Hammond and Colleagues, 2019). According to a study by Jones *et al.*, (2016), education is important for food security since it reduces the likelihood of a household experiencing food insecurity by 15.5%. According to Arndt *et al.*, (2020), the COVID-19 pandemic had a greater impact on food security in low-educated households than in households with secondary or tertiary education. Additionally, Arndt (2020) found that low households living below the food poverty line of R561 a month, rely on labour income and are the most susceptible and likely to run out of food because of employment and wage cuts.

2.9.5 Household income

The socioeconomic status of the household is one of the major contributors to household food insecurity in South Africa. Being of low socioeconomic status and having a low-income household result in the consumption of both an insufficient quantity and low-quality foods; the limited dietary diversity results in a low-quality diet with low vital nutrient content (De Cock *et al.*, 2013). Carter *et al.*, (2010) and Jacobs *et al.*, (2010) found a direct correlation between discretionary income and food security. Low-income households have historically had a higher likelihood of being indebted due to their inability to consistently purchase wholesome, safe, and nourishing meals (Omonona and Agoi, 2007). The primary underlying cause of inadequate food access for low-income households is poverty (Mishra and Rampal, 2020). According to Nwosu (2018), poor households are unable to get enough resources and food because of their low socioeconomic level. Due to their vulnerability, such households may only have limited access to food, which may prevent them from sharing it with other family members.

Studies carried out in Ghana and Nigeria showed that monthly household income boosted food security in households by 1.65 times (Ojogho and Alufohai, 2010; Omonona and Agoi, 2007). The importance of household income in determining food access at the national, household, and individual levels has also been discovered (Bashir *et al.*, 2012). According to a related study by FAO (2018), the size of the household, the combined income of the household's members, and the family structure, all have an impact on the household's food budget. A similar study by the

United Nations International Children's Emergency Fund states that low household income is associated with food insecurity in the home, which worsens living conditions and increases the likelihood of malnutrition in children under the age of five (FAO *et al.*, 2019).

2.10.6 Participation in Agriculture

According to Apanovich and Mazur (2018), most rural areas are dominated by subsistence farming, which contributes to household food security. Khan and Gill (2009) assert that farming in rural areas contributes to food availability. This might be explained by the fact that farming activities contribute to household food availability, diversity, and intake as money is not always available, especially in rural areas, to buy nutritious food. In many parts of the world, agriculture is essential for ensuring food security (FAO, 2014). The study goes on to say that agriculture helps reduce poverty by lowering food costs, generating jobs, boosting farm revenue, and raising salaries (FAO, 2010a). According to Samberg and Gerber (2016), many of the most disadvantaged people, particularly in rural areas of developing countries, depend on smallholder farming for their daily needs. The majority of rural households in Sub-Saharan Africa depend heavily on agriculture for their livelihood, and smallholder farming is strongly associated with rural poverty, malnutrition, and hunger (FAO, 2013).

Experience from other countries, according to the FAO report (2013), suggests that a comprehensive assessment of the provision of assistance to achieve growth in the smallholder agricultural sector is extremely important. According to the 2008 FAO report, agriculture is one of the sectors that can contribute significantly to the country's food security. In addition, most people, particularly in rural areas, were in desperate need of food. This was due to the fact that most people living in rural areas had access to land but lacked the necessary skills and resources to farm sustainably (FAO, 2018).

2.10.7 Food Prices

High food prices have an impact on household food security, food production, and national food supply (World Bank, 2020). The poor are especially vulnerable to the consequences of rising food prices. Food price increases, in turn, have an impact on diet quality. Thus, according to available data, higher dietary quality is associated with higher dietary cost. Food price increases have a significant impact on household food

security in South Africa (IFAD *et al.*, 2021). For example, because of the recent coronavirus pandemic, prices of foods such as ginger, garlic, and lemon have skyrocketed, putting a strain on household finances (Syafiq *et al.*, 2020). According to Akter and Basher (2014), one of the significant factors in all phases of food production that raises food prices is input cost.

Rising food prices have an impact on the poor's purchasing and eating habits (Mkhawani *et al.*, 2019). During the country's most severe lockdown, the government addressed the issue of rising food prices by reaching an agreement with major retailers like Pick n Pay and Checkers Shoprite to limit price increases on key items like maize meal and bread (Stats SA, 2020). This, however, expired immediately after the first easing of the lockdown on 4 May. In response to higher input prices, retailers have raised the prices of certain food items since then. The Pietermaritzburg Economic Justice and Dignity NGOs' price surveys show evidence of significant price increases on essential food items (PMBEDJD). They discovered an 8.2% increase in the price of a household food basket from March 2 to June 3, 2020 (PMBEJD, 2020). According to a World Food Program (2020) study, most people in African countries, including South Africa, changed their purchasing habits as food prices increased. Households stopped purchasing certain foods, switched to less expensive brands such as store brands, and some went to foreign-owned stores because they believed the prices were lower.

2.9.8 Household Assets

The relationship between household assets and food security in South Africa is like that of other developing countries (Ntwenya *et al.*, 2015). For example, Ntwenya *et al.*, (2015) discovered that farmland size, income diversity, and education level were all associated with improved household food security in Africa. Food security in rural households is also related to household wealth and the extent of social support (Hadley and Fitzherbert, 2007). There is a strong link between housing stability and food access. This is because, families in financial difficulty may have little money left over after paying their rent, face eviction or housing instability (having nowhere to safely store or prepare healthy food) or live in inefficient and expensive neighbourhoods where access to nutritious, affordable food is a little less possible (De Cock *et al.*, 2013). Food insecurity is both an income and a neighbourhood issue. Many low-income residents of South Africa live in underinvested neighbourhoods that

are in desperate need of transformation, particularly in areas with high levels of vacancy and blight (Mkhawani *et al.*, 2019). Families who lack mobility in and around their neighbourhood end up living further away from good schools, health care providers, employment prospects, and nutritious, affordable food (Torero, 2020). In addition, higher-income families can afford to buy healthier foods, exercise on a regular basis, and pay for health care and transportation. Conversely, job insecurity, low wages, and a lack of assets associated with a lack of education can make individuals and families more vulnerable during difficult times, leading to poor nutrition, unstable housing, and unmet medical needs (Haley *et al.*, 2020).

2.9.9 Credit Availability

Credit availability is also noted to worsen household food insecurity (Sonnino *et al.*, 2014). Many rural households are enticed to borrow because of access to credit; however, this traps them in a cycle of high interest rates that they are unable to pay due to their limited rural income sources. As a result, those with access to credit end up losing a larger portion of their household income to loan repayment, jeopardising the food budget. Maziya *et al.*, (2017) reported similar findings, claiming that credit users are more likely to be food insecure than non-credit users. Thus, while access to credit may improve food security in the short run, it ultimately reduces food security over time.

2.10 Government Programmes and Policies on Food Security

The 1996 South African Constitutional Law's Sections 26 and 27 explicitly mention the right to access enough food. Every citizen has a right to enough food, water, and social security, and the Constitution's Bill of Rights mandates that "the State must adopt reasonable legislative and other measures, within its available means, to accomplish the realization of this right" (FAO, 2013). At the household level, South Africa is deemed to be food insecure even though it is so mainly at the national level (Baiphethi and Jacobs, 2009). A review of the body of literature reveals several issues with South Africa's food security that have been discovered and recorded and are important to note (FAO, 2010a).

2.10.1 The Integrated Food Security Strategy (IFSS) of 1996: Department of Agriculture, Forestry and Fisheries (DAFF)

To streamline, consolidate, and integrate the various food security programmes, the Cabinet approved the national Integrated Food Security Strategy (IFSS) in 2002. Several achievements have been made in the Strategy's several priority sectors, and thanks to a combination of domestic production and food imports, South Africa can now boast national food sufficiency (IFSS, 2002). Additionally, according to the General Household Survey (GHS), the food access index has improved, and the prevalence of hunger has decreased (FAO, 2014). However, everyone's safe access to food is still not assured. According to Harris *et al.*, (2015), factors such as globalisation, international trade policies, climate change, and inadequate food distribution and storage pose a danger to family food security. Additionally, without coordinated measures, a growing proportion of the population may not have enough access to food, and many people may not receive the nutrition they need. In addition, the IFSS must be reviewed, and a comprehensive National Food and Nutrition Security Policy must be developed, due to the global economic slowdown, increased food price volatility, and the effects of climate change (Harris *et al.*, 2015).

2.10.2 The Integrated Nutrition Programme (INP) of 1995: Department of Health

One of the most important strategic health programmes, the Integrated Nutrition Programme (INP) aims to prevent malnutrition and reduce morbidity and mortality rates. It has succeeded in achieving some of its goals, including the expansion of access to primary healthcare and improved food and nutrition security, among others (FAO, 2000). Education about diet and the promotion of health through measures like parasite control and vitamin supplementation were other priority areas. The Primary School Nutrition Program has chosen to transition from being a vertical programme to being a component of the country's Integrated Nutrition Program. Community-based nutrition projects are developed using the INP as a launchpad. It entails creating a thorough school nutrition programme with connections to the neighbourhoods, other school health programmes, and other non-health sectors (FAO, 2016).

2.10.3 The Comprehensive Agricultural Support Programme of 2005 (CASP)

This programme's goal is to offer post-settlement assistance to the targeted land reform recipients and other farmers who purchased property privately and are, for instance, involved in domestic value-adding businesses or exporting (DAFF, 2019). Several government ministries collaborated on the Comprehensive Agricultural Support Programme (CASP), which also includes the Household Food Production Programme, which was designed to help households without access to surplus food. This was to promote prosperity through agriculture and enhance national and household food security. The CASP also concentrated on talent and knowledge transfer as well as financial and marketing guidance (DAFF, 2017).

2.10.4 Micro Agricultural Finance Initiatives of South Africa (MAFISA) of 2006

The National Department of Agriculture (NDA) and the Development Finance Institution of South Africa (DFISA) launched MAFISA in 2005 with the goal of giving credit to aspiring black farmers and the working poor to improve livelihoods and reduce poverty by establishing successful business ventures (HSRC, 2018). To empower smallholder/micro level producers and processors in the agriculture, forestry, and fisheries sectors, MAFISA aims to provide financial services. The Comprehensive Agricultural Support Program (CASP (MAFISA)'s financial support pillar (FAO, 2015). The provincial department of agriculture and the financial intermediaries "shall have a close working connection," according to the policy framework (DAFF, 2017). The main goal of establishing these cooperative ties is to guarantee that extension officers help potential beneficiaries to apply for loans and that there is cooperation in providing technical support to the beneficiaries to increase their chances of success. But, only a small number of provinces, including the Limpopo Province, actively support or promote MAFISA.

2.10.5 The Comprehensive Rural Development Programme (CRDP) of 2009: Department of Agriculture, Forestry and Fisheries (DAFF)

The Comprehensive Rural Development Programme refers to the steps taken and activities done to raise the living standards of communities outside of urban regions. These regions are typically characterised by a low population density in vast open spaces with a focus on agriculture, while most the region's economic activities are focused on the production of food and raw materials (World Bank, 2018). The goal of integrated rural development is to provide long-term improvements in the lives of rural

residents and rural economies. It is a planning concept and, consequently, a strategy for multi-sectoral and multifaceted interventions. Programmes for rural development are more successful and have longer-lasting effects when they are combined with local traditional knowledge. Therefore, for rural development to be successful and acceptable, public participation is crucial (World Bank, 2018).

2.10.6 The New Growth Path (NGP) and National Development Plan (NDP) Vision 2030 of 2012

A national organisation whose development strategies aim to improve livelihoods and reduce disparities through job creation is the National Growth Plan (NGP) adopted in 2010 by the Economic Development Department (EDD) and the NDP Vision 2030 of 2012 (FAO, 2010a). There is a growing understanding that a new economic path built on a reorganisation of the South African economy to enhance its results in terms of labour intake and also the structure and rate of growth is the only way to create decent jobs, reduce inequality, and eradicate poverty (DAFF, 2019). The NGP clearly describes how agriculture has the potential to create 1 million employments through increasing irrigated and land-based agriculture and implementing a successful land reform programme (FAO, 2010a).

CHAPTER THREE

DESCRIPTION OF THE STUDY AREA, RESEARCH METHODOLOGY AND ANALYTICAL PROCEDURES

3.0 Introduction

The chapter gives a detailed description of the study area and elucidates the study's methodological approaches. This chapter includes the data sources, tools for data collection and sampling methods, as well as a description of a scientific model for data analysis.

3.1 Description of the study area

The study was conducted in the Limpopo Province of South Africa, at Makhado Local Municipality (MLM). The municipality is in the northern part of the Limpopo Province and has a population of approximately 416 728 people and is classified as predominantly rural due to larger rural population's size. The Municipality is made up of four administrative areas, namely, Louis Trichardt, Vleifontein, Waterval, and Dzanani. The main administrative office is in Louis Trichardt town and is supported by three regional administrative offices in Dzanani, Vleifontein and Waterval. The study area (MLM) was chosen because it is dominated by rural areas and there are significant gender disparities in the distribution of vital components essential for food security across the municipality, such as access to arable land, inputs, knowledge, and information about farming (MLM Integrated Development Plan, 2017).

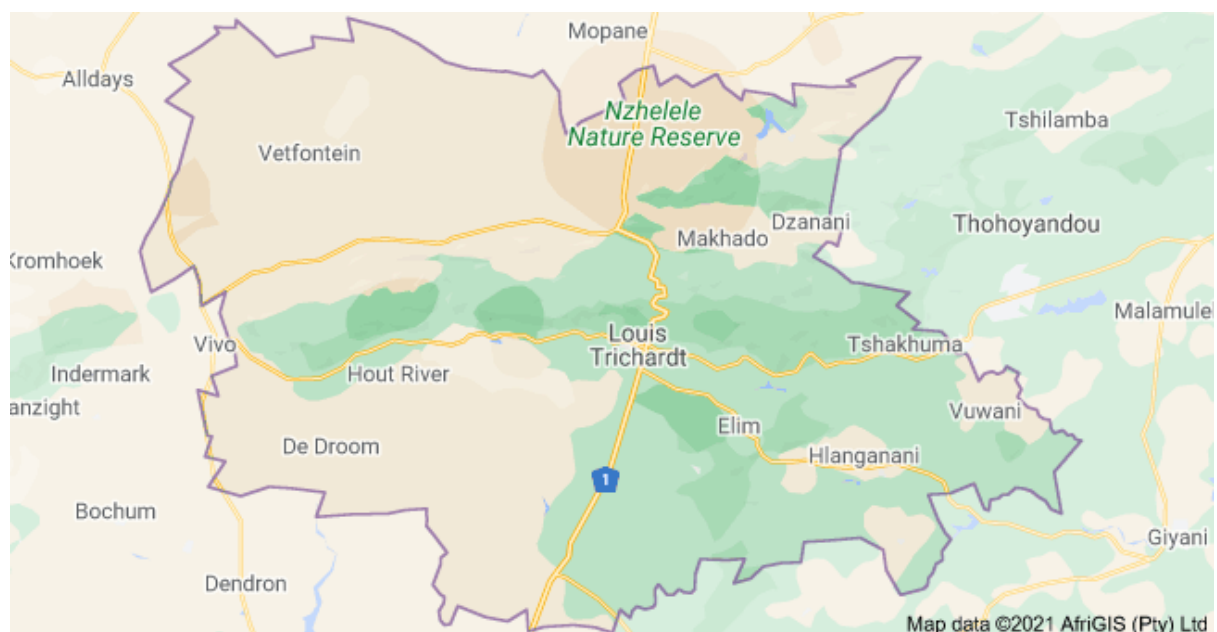


Figure 3. 1: Map of MLM

Source: Local Government Handbook (2016).

3.2 Research design, sampling procedure and data collection methods

For this study, a cross-sectional data on the effects of COVID-19 induced restriction towards rural household food security was collected. The sampling procedures employed for the study were purposive sampling and proportional random sampling. Primary data were collected from the randomly selected respondents using a structured questionnaire with household heads as the unit of analysis. Four administrative areas were used for this study, namely, Louis Trichardt, Vleifontein, Waterval and Dzanani and these four areas comprise 34192 rural households. For instance, Louis Trichardt has 7712 rural households, Vleifontein has 7816 rural households, Waterval has 9712 rural households and Dzanani has 8952 rural households. From all the four administrative areas, rural settings were used for the purpose of this study (Municipalities South Africa, 2018). The sample size for this study was calculated using the following formula as per Kothari (2004):

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

Where, n = desired sample size, z = value of standard deviation at 95% confidence level (in this case 1.96), e = desired level of precision ($\pm 5\%$), p = sample proportion in target population, q = 1 – p and N = size of population.

This gave a total of 139 rural households from all the four administrative areas as a sample size. From the sample size, a proportional random sampling technique was therefore used to select households to participate in the study. The reason for employing proportional random sampling procedure is that the town with the highest number of rural households had a larger sample size, just like an administrative area with the lowest number of rural households had a smaller sample size.

3.3. Analytical techniques

A descriptive statistic was used to identify and describe the socioeconomic factors of rural households for objective one. For objective two, a Household Food Insecurity Access Scale (HFAS) and descriptive analysis were used to examine and

characterise the food security status of rural households at MLM. Furthermore, descriptive statistics was used to identify and describe coping strategies used by households in obtaining food in the presence of COVID-19 at MLM. For objective four, Household Food Insecurity Access Scale (HFIAS), Household Dietary Diversity Score (HDDS) and the Multiple Linear Regression Model were used to investigate and analyse the effect of COVID-19 induced restrictions towards household food security. The HFIAS is a brief survey instrument developed by the Food and Nutrition Technical Assistance (FANTA) organisation to determine whether households have had problems with food access in the previous 30 days (Coates *et al.*, 2006). The instrument consists of nine occurrence questions, as indicated in Table 1 below:

Table 3. 1: The generic HFIAS questions for households

Questions	Response options
	1= Rarely (once or twice in the past 30 days) 2= Sometimes (three to ten times in the past 30 days) 3= Often (more than 10 times in the past 30 days).
1. Did you worry that your household would not have enough food?	
2. Were you or any household member not able to eat the kinds of foods you preferred because of the lack of resources?	
3. Did you or any household member have to eat limited variety of foods due to the lack of resources?	
4. Did you or any other household member eat some foods that you really do not want to eat because of the lack of resources to obtain other types of food?	
5. Did you or any household member have to eat a smaller meal than you felt you needed because there was not enough food?	

6. Did you or any household member have to eat fewer meals in a day because there was not enough food?	
7. Was there ever no food at all in your household because there were not resources to get more food?	
8. Did you or any household member go to sleep at night hungry because there was not enough food?	
9. Did you or any household member go a whole day without eating anything because there was not enough food?	

Source: FAO (2013)

The HFIAS was calculated as a continuous indicator, with each of the nine questions scored 0-3, with 3 being the highest frequency of occurrence, and the total score added. The total HFIAS can range from 0 to 27, indicating the degree of food insecurity. Households can also be classified as food secure, mildly food insecure, moderately food insecure, or severely food insecure as a categorical variable (Coates *et al.*, 2007). The HDDS indicator is calculated using the 12 food groups listed in Table 3.2 below.

Table 3. 2: The HDDS generic questions

Questions	Coding categories (yes = 1, no = 0)
1. Any bread, rice noodles, biscuits, or any other foods made from millet, sorghum, maize, rice, wheat?	
2. Any potatoes, yams, manioc, cassava or any other foods made from roots or tubers?	
3. Any vegetables?	
4. Any fruits?	
5. Any beef, pork, lamb, goat, rabbit wild game, chicken, duck, or other birds, liver, kidney, heart, or other organ meats?	
6. Any eggs?	

7. Any fresh or dried fish or shellfish?	
8. Any foods made from beans, peas, lentils, or nuts?	
9. Any cheese, yogurt, milk or other milk products?	
10. Any foods made with oil, fat, or butter?	
11. Any sugar or honey	
12. Any other foods, such as condiments, coffee, tea?	

FANTA (2006)

The Household Dietary Diversity Score (HDDS) is a simple count that calculates a proxy measure for household food insecurity based on a variety of different food groups consumed by the household over a given reference period. A lack of dietary diversity was a predictor of food insecurity. The purpose of calculating dietary diversity was to gain insight into household food insecurity levels, as food insecure households tend to rely excessively on starchy staples while excluding proteins and other dietary nutrients (Azadbakht *et al.*, 2005). Low dietary diversity was a good predictor of household food insecurity. Each food group was assigned a score of 1 (if consumed) or 0 (if not consumed) (Swindale and Bilinsky, 2006). The household score ranged from 0 to 12 and was equal to the total number of food groups consumed by the household:

$$\text{HDDS} = \text{SUM} (A+B+C+D+E+F+G+H+I+J+K+L)$$

The average household dietary diversity score for the population of study can be calculated as follows:

$$\frac{\text{Sum (HDDS)}}{\text{Total number of households surveyed}}$$

The score is calculated as the sum of the food groups consumed by household members out of a total of 12. For this study, both HFIAS and HDDS questions were asked to households prior to the COVID-19 pandemic, and the same questions were also asked to households during the current period of COVID-19 pandemic. As a result, an analysis of both HFIAS and HDDS scores prior to and during COVID-19 were able to profile whether the pandemic has an effect on rural household food security status or not.

After obtaining the HFIAS and HDDS scores, the Multiple Linear Regression Model was used to analyse the effects of COVID-19 induced restrictions on rural household food security. COVID-19 was declared a pandemic on the 11th of March 2020, therefore, given the nature of food security indexes, any 30 days (month) before the official declaration of a pandemic by the World Health Organisation were treated as before COVID-19 for both HFIAS and HDDS questions. In the Multiple Linear Regression Model, the HFIAS and HDDS were treated as separate continuous variables in both the food security status prior to COVID-19 and the food security status during COVID-19; thus, two separate regression analysis were done. Regression analysis was performed to estimate the factors influencing food security prior and during COVID-19 pandemic. A Multiple Linear Regression analysis is a variation on a simple linear regression analysis that is used to assess the relationship between two or more independent variables and a single continuous dependent variable. The equation for multiple linear regression is, according to Bremer (2012), as follows:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \beta_{10} X_{10} + \dots + \mu$$

Where β_0 is the intercept and $\beta_1, \beta_2, \beta_3, \dots, \beta_i$ are the slope parameters, which measure the change in Y_i for a unit in the change in explanatory variables. X_1, X_2, \dots, X_{10} . These factors explain the effect of COVID-19 on food security or the probability that the i th household is food secure at MLM. These factors are explained as follows:

Y_i = HFIAS and HDDS

X_1 = Level of education for a respondent

X_2 = Gender of a respondent

X_3 = Household income per month

X_4 = Marital status

X_5 = Access to credit information

X_6 = COVID-19 Relief Fund

X_7 = Household size

X_8 = Farming experience

X₉ = Employment status

X₁₀ = Source of income

X₁₁ Level of income for a household Head

Table 3. 3: Description of variables specified in Multiple Linear Regression

Dependent Variables				
Model sign	Abbreviations	Variables	Description	Measuring unit
Yi	RHFS	HFIAS and HDDS	0-27 and 0-12 Scores	Continuous
Independent variables				
Model sign	Abbreviations	Variables	Description	Measuring unit
X1	LEDU	Level of education of a respondent	0=no formal education, 1=primary, 2=Secondary, 3=Tertiary	Categorical
X2	GEND	Gender	1, if the correspondent is a female, 0 otherwise	Dummy
X3	HHIN	Household income	Income per month of a respondent	South African Rands (ZAR)
X4	MSTT	Marital status	0 = Married, 1 = Single, 2 = Widowed, 3= Divorced.	Categorical
X5	AACI	Access to credit information	1, if respondent/has	Dummy

			access to credit information, 0 if otherwise	
X6	CRF	COVID-19 Relief Fund	1, if the respondent receives a COVID-19 relief fund, 0 otherwise	Dummy
X7	HSIZ	Household size	Number of individuals in the household	Number of members within a household
X8	FEXP	Farming experience	Number of years in farming.	Years
X9	EMSS	Employment status	1, if the responded is employed, 0 otherwise	Dummy
X10	SOIE	Source of income	If the respondent receives any form of money or not	Dummy
X11	INCHH	Level of income of a household head	Income per month of a respondent	Categorical
X12	HOLA	Household ownership of land assets	The value of land assets	Continuous

3.4 Review of models and approaches for the study

This section describes the models and approaches that were used to address the study's objectives. The factors influencing food security prior to and during the COVID-19 pandemic, as well as household food security (HFIAS and HDDS), were estimated using multiple linear regression models. Furthermore, the Household Food Insecurity Access Scale (HFIAS) and Household Dietary Diversity Score (HDDS) were used to estimate household food security.

3.4.1 Purposive Random sampling method

Purposive sampling, also known as judgment sampling, is the purposeful selection of a participant based on the traits that the participant has (Zhi, 2014). It is a non-random approach that does not require underlying theories or a predetermined number of participants. Simply expressed, the researcher determines what needs to be understood and then seeks out persons who can and are willing to supply the information through expertise or experience (Zhi, 2014). It is commonly used in qualitative research to discover and pick the most information-rich examples to make the most use of available resources. Purposive sampling strategies prioritize saturation (i.e., getting a full knowledge by sampling until no new substantial information is collected). The method's inherent bias contributes to its efficiency, and it remains robust even when evaluated against random probability sampling (Tongco, 2007). Choosing a purposeful sample is critical to the quality of data collected; hence, the informant's dependability and competency must be assured.

3.4.2 Multiple Linear Regression

Multiple Linear Regression (MLR), also known as multiple regression, is a statistical technique that predicts the outcome of a response variable using several explanatory variables. MLR attempts to model the linear relationship between explanatory (independent) and response (dependent) variables (Kothari, 2004). The HFIAS (Household Food Insecurity Access Scale score) and (Household Dietary Diversity Score) generated HDDS were used as dependent variables in two regression equations. Regressing the independent variables (X) against HDDS (Y), factors that condition HDD (Household Dietary Diversity) and regressing the independent variables (X) against HFIAS score (Y), factors that condition HFIA (Household Food Insecurity Access) were estimated in this study.

3.4.3 Household Food Insecurity Access Scale (HFIAS)

The total HFIAS score can range between 0 and 27, indicating the level of food insecurity. As a categorical variable, households can be classified as food secure, mildly food insecure, moderately food insecure, or severely food insecure (Coates *et al.*, 2007). The HFIAS is a brief survey instrument developed by the Food and Nutrition Technical Assistance (FANTA) organisation to determine whether households have had problems with food access in the previous 30 days (Coates *et al.*, 2006). The HFIAS, according to Coates *et al.*, (2014), is a continuous measure of the degree of food insecurity (access) in the household (in the past 30 days). To begin with, for each household, an HFIAS score variable is calculated by adding the coded frequency of experience for each question. A household's maximum score is 27 (the household's response to all 9 questions was "often," coded with a response code of 3); the minimum score is 0. The higher the score, the greater the household's food insecurity (access). The lower the score, the lower the household's food insecurity (access).

3.4.4 Household Dietary Diversity Score (HDDS)

Household Dietary Diversity (HDD) is typically calculated by adding the number of foods consumed or, more commonly, by counting the number of food groups consumed over a given period (Vakili *et al.*, 2013). The Household Dietary Diversity Score (HDDS) is a simple count that computes a proxy measure for household food insecurity based on a variety of food groups consumed by the household over a given reference period (Vakili *et al.*, 2013). Respondents were asked to recall all foods and beverages consumed in the previous seven days preceding the interview for the purposes of this study. Dietary variety is a crucial method for evaluating food security from a nutritional perspective, according to a study by Ajani (2010). Dietary variety and nutrient sufficiency, the two elements of food quality that are most crucial, were also associated to dietary diversity.

The purpose of calculating dietary diversity was to gain insight into household food insecurity levels, as food insecure households tend to rely excessively on starchy staples while excluding proteins and other dietary nutrients (Azadbakht *et al.*, 2005). Low dietary diversity was a good predictor of household food insecurity. Each food group was assigned a score of 1 (if consumed) or 0 (if not consumed) (Swindale and Bilinsky, 2006). The household score ranged from 0 to 12 and was equal to the total number of food groups consumed by the household.

3.4.5 Review of methodologies for the study

The World Bank Group (2020) conducted a study together with the public sector at a national level with international partners that closely monitored domestic food and agricultural supply chains. The aim of the study was to track how the loss of employment and income was affecting people's ability to buy food and ensure that food systems continue to function despite COVID-19 pandemic challenges. This research was done and concluded using secondary data by comparing previous trends of agricultural supply chains. Although the study gives an overview of the effects of COVID-19 about people's ability to obtain food in the presence of COVID-19, the analysis is at the broader level rather than at the household level. Therefore, the study was concentrated on the coronavirus' macroeconomic and financial impact. The impact on food security was then translated into the socioeconomic impact on individuals. Results of the study estimated that COVID-19 dramatically increased the number of people facing acute food insecurity in years 2020 and 2021.

A similar study was conducted by Makgobokwane (2019) on determinants of food security among small-scale maize farmers in the Polokwane Local Municipality, Capricorn District, Limpopo Province, South Africa. Primary data were collected from a sample size of 150 farmers through a structured questionnaire, while HFIAS was used to determine the food security status and Logistic Regression Model was employed to analyse the data. According to the HFIAS results, 53% of households were food secure, while 47 % were food insecure, with 16.0% mildly, 21.3% moderately, and 9.3% severely food insecure. The logistic regression results revealed that only six variables, including farmer age, educational level, household size, household income, farm size, and access to credit, had a significant relationship to farmers' food security status.

Sentsho (2020) also conducted a study whose aim was to investigate the factors that influence food security in rural households in Magong, Northwest Province, South Africa, where farming is the most common economic activity, supplemented by other formal and informal jobs. The respondents who were interviewed were chosen using a multi-stage sampling technique. The study discovered that the larger the household size, the more secure the food supply.

A study conducted by Shetty *et al.*, (2020) quantified the effect of market disruptions due to COVID-19 on the lives of households in rural areas of Liberia and Malawi, utilising panel data from phone surveys that were implemented as part of a randomised cash transfer experiment. The surveys began collection several months before the pandemic and have continued throughout it. The household survey included a consistent set of internationally accepted and validated questions on food security (the house-hold dietary diversity score, the household hunger scale, and the food consumption score).

When presenting the study's findings, researchers must find a way to justify their choices. Although the logistic regression model is easily extensible to multiple classes (multinomial regression) and provides a natural probability distributions perspective of class predictions. The study attempted to regress two separate sets of data of the respondents before the occurrence of the COVID-19 pandemic and during the pandemic. Hence, the logistic regression model was not suitable for this study because the assumption of linearity between the dependent variable and independent variables of the study is the significant limitation of the model.

Most of the other analytical tools used in the previously reviewed studies such as proportional random sampling, HFIAS and HDDS, were the analytical techniques because they enabled the analysts to measure three components of food security, namely, food availability, food accessibility, food utilisation and food stability. Dietary diversification is an essential technique for assessing food security from a nutritional standpoint. Dietary diversity is linked to nutrient adequacy and diet variety, which are the two most important components of diet quality. This instrument was selected for the purpose of the study because it covers the component of food security, which is food utilisation, food availability and food access. According to Ajani (2010), information containing either individual or household dietary diversity in the population can serve as a simple and effective indicator of various parameters that affect people's nutrition in any group. MLR was also suitable for data analysis in this study because it is a variation on a simple linear regression analysis that is used to assess the relationship between two or more independent variables and a single continuous dependent variable. The HFIAS and HDDS from each household were treated as continuous dependent variables and regressed against several independent variables.

3.5 Summary

The aim of this chapter was to give an overview of the analytical tools used in the study. In this chapter, models and variables that were used in the study were outlined. The study used the Household Food Insecurity Access Scale (HFIAS) and Household Dietary Diversity Score (HDDS) to measure food security while Multiple Linear Regression analysis was performed to estimate the factors influencing food security prior and during COVID-19 pandemic. The study intended to analyse how COVID-19 induced restrictions have affected rural household food security at MLM in the Limpopo Province. Conclusions of the study were drawn based on the HFIAS, HDDS and Logit models. The chapter also provided the justification for the chosen methods of data analytical techniques.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.0 Introduction

The section presents and discusses the study's findings on the effects of COVID-19 on rural household food security at MLM. The study's findings were divided into two categories: the analysis of household food security using food security measures such as the HFIAS, HDDS, and regression analysis.

4.1 Socioeconomic characteristics of the respondents

This section comprises demographic information of the sampled households, such as age, gender, household size, marital status, employment status, credit access, and educational levels, among others. These factors are important because the household head oversees the primary economic operations and is most likely to be influenced by demographic factors when making decisions (Agidew and Singh, 2018; Laborde *et al.*, 2020; Mayekiso *et al.*, 2017). When examining factors that influence a household's economic behavior and decision-making capacity, demographic characteristics are critical. Therefore, these factors were thought to influence rural households access to food in their homes.

4.1.1 Summary statistics of respondents' socioeconomic characteristics

Table 4. 1: Summary statistics of age, size, household monthly income and credit received.

Variables	Mean	Std.Deviation	Minimum	Maximum
Age	51.17	14.080	22	81
Household size	7.26	2.689	3	14
Monthly income	2943.26	2806.518	500	18000
Credit received	1997.83	1104.791	800	5000

Source: Research Survey (2022)

According to Table 4.1, the household head's average age in the study area was 51, with a minimum age of 22 and a maximum age of 81 years. The results indicate that

most of the household heads from the study were in their 50s. The number of people who resided in the same home was referred to as the household size in this study. As shown in Table 4.1, the average number of household members was 7, with a minimum size of 3 members and the maximum of 14 members. The average monthly family income was R2943.26, the maximum monthly household income was R18 000.00, and the minimum monthly household income of R500.00. The average amount of credit received per month was R1998, the maximum amount of credit received by a household that qualifies for credit was R5000, with the minimum amount of money borrowed of R800 per month.

a. Gender of Household Heads

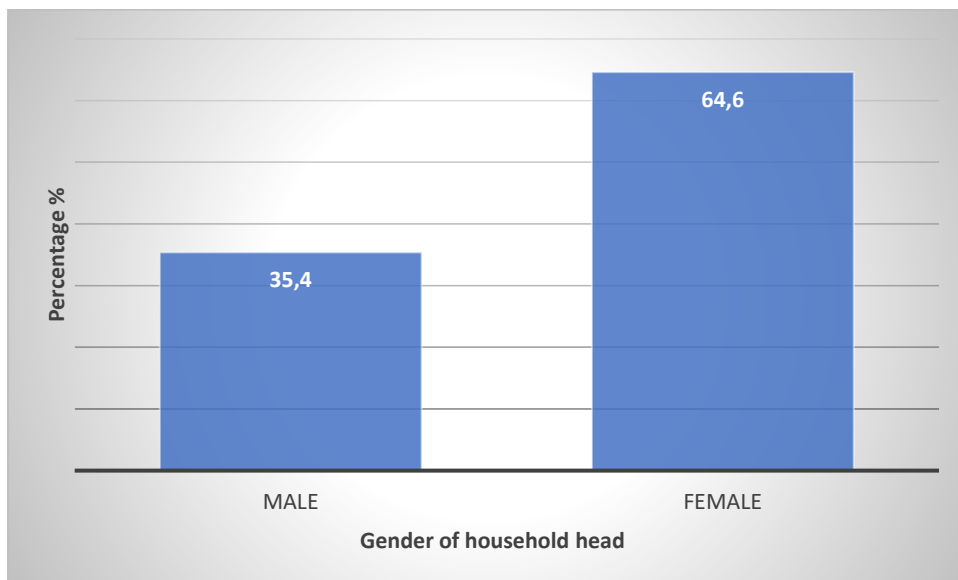


Figure 4. 1: Gender of household heads,

Source: Research Survey (2022)

In this study, if the household head was a man who worked in another province, town, or city, the household was headed by a female or another person responsible for the family most of the time and made decisions. Furthermore, female-headed homes included those who were divorced, never married, or whose husbands had died. Figure 4.1 depicts the gender distribution of household heads in the study area. Females accounted for 64.6 % of household heads in the survey, while men accounted for only 35.4 %. In the last half-century, the number of female-headed households has increased dramatically, particularly in developing countries (Nwosu and Ndinda, 2018). Divorce, spouse's death, husband's disability, increased life expectancy among

women, migration, or being abandoned by husbands, are all reasons for this. Female heads typically have less time for market work due to their significant involvement in home production, which leads to them preferring more leisure or lower-paying jobs that allow them more time to perform household chores (Mabugu and Chitiga, 2013).

Furthermore, when seeking employment or social welfare, female heads are more likely to face discrimination. Given that employment is one of the most important sources of income and a key driver of poverty escape, determining the prevailing employment patterns in female-headed households versus male-headed households is likely to provide very useful insights into closing any potential poverty gap between both household types (Makgobokwane, 2019).

b. Marital status of the household head

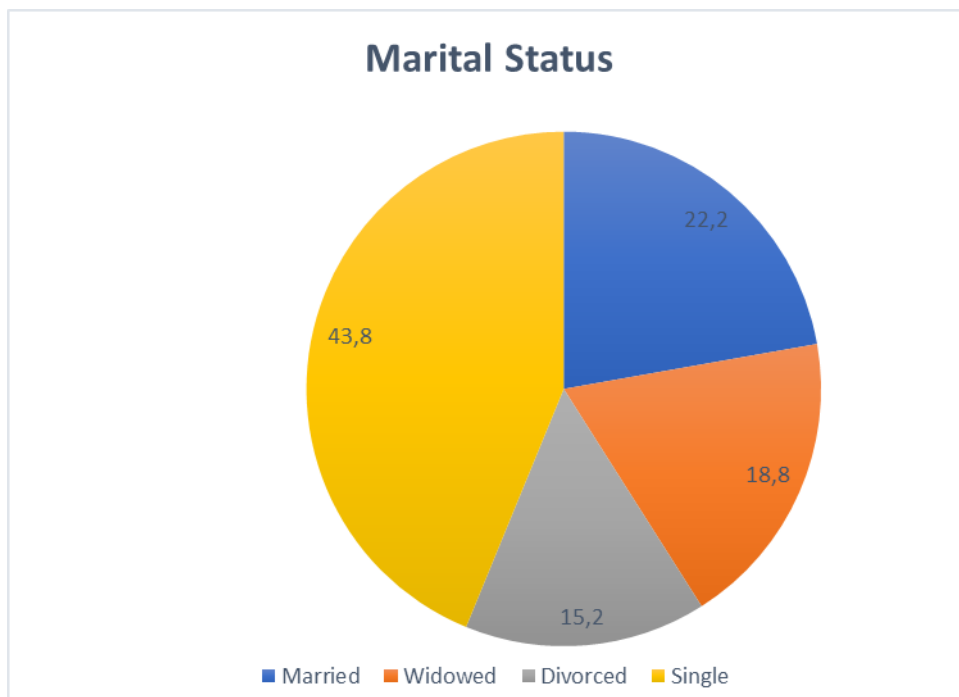


Figure 4. 2: Marital status of household head

Source: Research Survey (2022)

From the results obtained, a large percentage of the sampled household heads were single and only a few were married. This is notable in Figure 4.2, which shows that about 22.2% of the household heads were married, 43.8% were single, 15.2% were divorced and 18.8% were widowed.

c. Level of education of a respondent

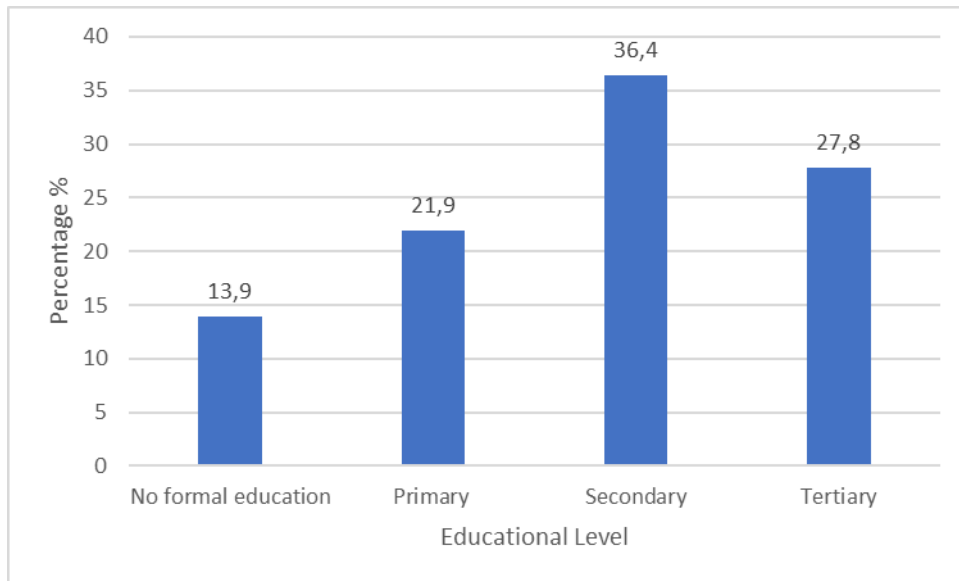


Figure 4. 3: Level of education of a respondent

Source: Research Survey (2022)

According to the findings, most of the household heads obtained secondary education, and quite a few people had tertiary education. Figure 4.3 shows that 21.5% only received primary education, 36.4% received secondary education, 27.8% received tertiary education, and 13.9% comprised the respondents who never went to school. The sampled population had a higher proportion of people with only primary education. Education influences food security in the rural context through access to information on the best agricultural production, nutrition, and sanitation; increased efficiency, thus, increased production and better decision-making; and the pride that comes with education (De Muro and Burchi, 2007; Bashir and Schilizzi, 2013). Because of their increased purchasing power, individuals, and households with higher levels of education are more likely to be food secure.

d. Assistance from the government/private sector

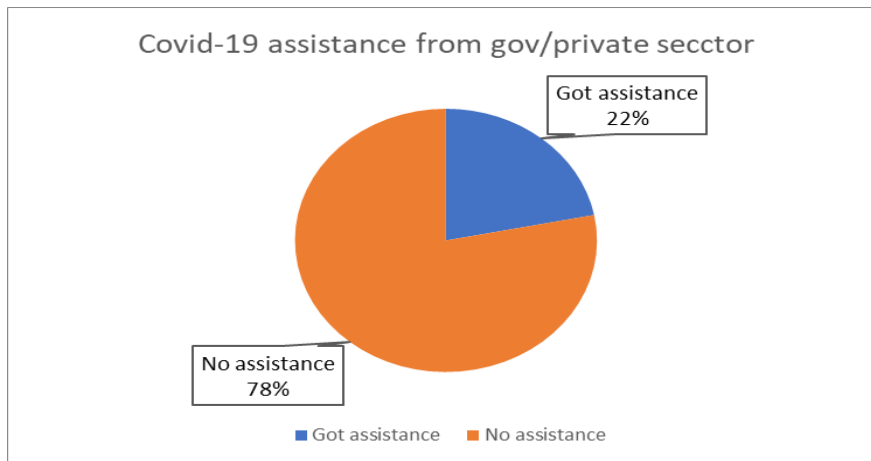


Figure 4. 4: Assistance from the government/private sector
Source: Research Survey (2022)

Many households did not receive any type of COVID-19 assistance from both the government sector and the private sector. The assistance could have been in the form of food or the form of money. This is notable in Figure 4.4 below, which shows that 21.9% of the households received assistance, and about 78.1% of the households did not receive any type of assistance.

e. Employment status of household head

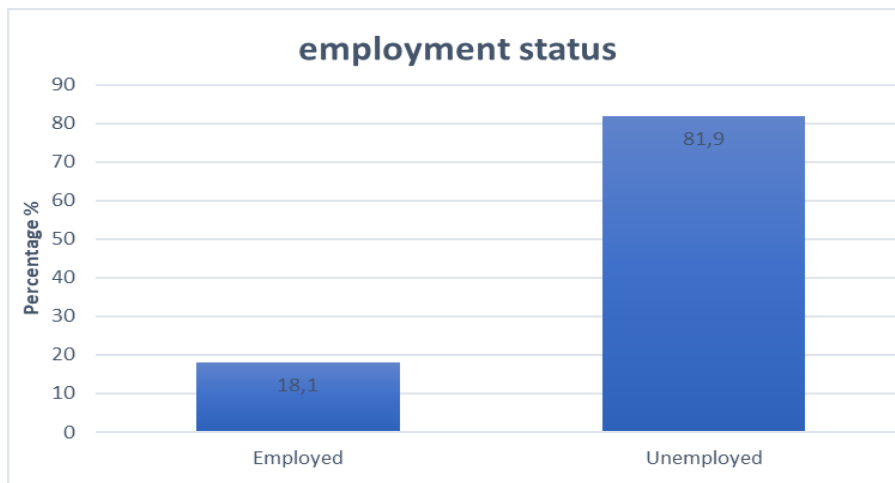


Figure 4. 5: Employment status of household head
Source: Research Survey (2022)

According to the survey results, most respondents were unemployed. Figure 4.5 shows that only 18.1% of respondents were employed, while the remaining 81.9% were either retired, unemployed, or retrenched. Most of the respondents (61 %) relied on social grants to survive. The social grant net is the government’s most significant intervention in poverty alleviation and redistribution. Despite targeting specific vulnerable groups (such as the young, elderly, or chronically ill), social grants benefit households in general (Altman *et al.*, 2014). As a result, there is concern that households receiving social grants may become dependent on the income from the grants rather than engaging in economic activities. According to Altman *et al.*, (2014), social grants, as unearned income, create disincentives to engage in economic activities and earn a living.

f. Access to the credit of the household head

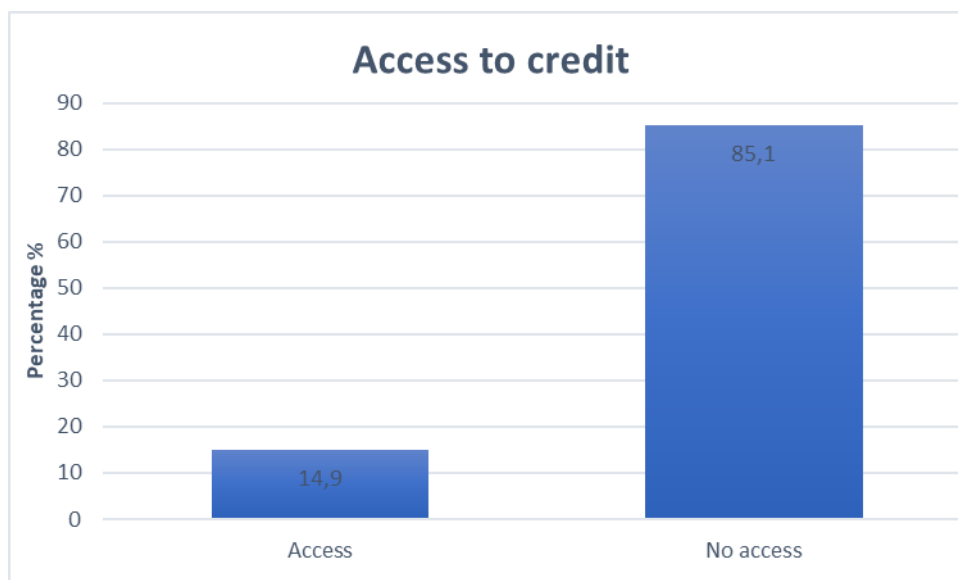


Figure 4. 6: Access to the credit of the household head,
Source: Research Survey (2022)

Figure 4.6 depicts the household head’s access to credit. According to the study findings, only 14.9% of the sampled rural household heads received credit. However, the credit was monetary. These funds provided credit access by directing funds intended for food purchases. Approximately, 85.1% of respondents were denied credit due to a lack of collateral, the security required by most lending institutions. According to Taylor *et al.*, (2011), one of the significant variables that leads to increased household food security is access to credit.

4.2 Analysis of food security using the HFIAS

Food security analysis was based on the evaluation of the nine occurrence questions extracted from HFIAS. As indicated in Table 4.2, the level of food security was expressed by the numbers 1 and 0, where one meant that the households agreed to the occurrence question and 0 meant disagreement to the occurrence question.

Table 4.1

Table 4.2: Households' Response using HFIAS (before COVID-19)

Options: Before COVID-19								
	Uncertain		Rarely		Sometimes		Often	
HFIAS questions	N	%	N	%	N	%	N	%
Q1: Worry about food	46	32.4	35	24.6	53	37.3	8	5.6
Q2: Unable to eat preferred foods	53	37.3	43	30.3	35	24.6	11	7.7
Q3: Eat just a few kinds of foods	55	38.7	41	28.9	37	26.1	9	6.3
Q4: Eat foods they really do not want to eat	67	47.2	32	22.5	35	24.6	8	6.6
Q5: Eat a smaller meal	58	40.8	36	25.4	42	29.6	6	4.2
Q6: Eat fewer meals in a day	71	50.0	38	26.8	26	18.3	7	4.9
Q7: No food of any kind in a household	109	76.8	25	17.6	7	4.9	1	0.7
Q8: Go to sleep hungry	101	71.1	26	18.3	14	9.9	1	0.7
Q9: Go a whole day and night without eating	99	69.7	26	18.3	15	10.6	2	1.4

Source: Research survey (2022)

Table 4.2 shows the food security status of the respondents before COVID-19 based on the nine HFIAS questions. This measurement was used to see if the households had access to healthy food and if the food, they preferred was readily available. The scale was developed based on the theory that by categorising families according to their level of food insecurity, it is possible to identify, measure, and analyse the prevalence of food insecurity (Swindale and Bilinsky, 2006). Before COVID-19, the respondents' poverty was not so extreme that they could not afford food for their households, could not go to bed hungry, or could not go the entire day and night without eating. For instance, many households are eligible for social handouts that help with the cost of essential basic goods like maize meals and cooking oil. Due to some parents' employment and the children's attendance of school, it is nearly

impossible for families to share a meal. Furthermore, with the new government feeding programmes in schools, children are fed at school.

Table 4. 3: Households' Response using HFIAS (during COVID-19)

Options: During COVID-19									
	Uncertain		Rarely		Sometimes		Often		Mean
HFIAS questions	N	%	N	%	N	%	N	%	
Q1: Worry about food	20	14.1	8	5.6	37	26.1	77	54.2	1.23
Q2: Unable to eat preferred foods	25	17.6	10	7.0	47	33.1	60	42.3	0.98
Q3: Eat just a few kinds of foods	26	18.3	9	6.3	52	36.6	55	38.7	0.96
Q4: Eat foods they really do not want to eat	28	19.7	11	7.7	42	29.6	61	43.0	0.94
Q5: Eat a smaller meal	24	16.9	11	7.7	47	33.1	60	42.3	0.82
Q6: Eat fewer meals in a day	28	19.7	11	7.7	50	35.2	53	37.3	0.83
Q7: No food of any kind in a household	68	47.9	23	16.2	21	14.8	30	21.1	0.54
Q8: Go to sleep hungry	44	31.0	28	19.7	40	28.2	30	21.1	0.47
Q9: Go a whole day and night without eating	44	31.0	20	14.1	40	28.2	38	26.8	0.46

Source: Research survey (2022)

The HFIAS outcomes during the COVID-19 pandemic are shown in Table 4.3. The COVID-19 pandemic, which resulted in employment losses and the passing of some household breadwinners, increased the dread of not having enough food to feed the entire family. Over this time, low-income households have been the primary victims of job losses, and the generated decreases in income have left many individuals and families vulnerable to food insecurity. The sampled population reported losing loved ones, primarily older people who provided the household's income. Food insecurity in households already existed before the COVID-19 pandemic, but the situation worsened throughout the outbreak. For instance, in the rural parts of MLM, only 18.1% of the population is employed, and 81.9% of the population is either jobless or has any formal employment, as shown in Figure 4.5. Many households rely on social grants like old age pensions and child support grants to survive.

According to Béné (2020), one of most destructive causes of hunger is unemployment. Many people are on the edge of becoming hungry because of the loss of money and the stress that comes with it. The COVID-19 pandemic caused the cost of essential

commodities to soar. As a result, families could not buy enough food to last them for an entire month. Most households did not receive COVID-19 aid, such as food baskets/parcels. As a result of the pandemic, many went to bed hungry and went without eating for the day. Many families were forced to change their eating habits, which led to adults giving up their meals so that young children could eat. The most well-known tactic was restricting the family’s mealtimes and food quantities.

a. Response to HFIAS question 1

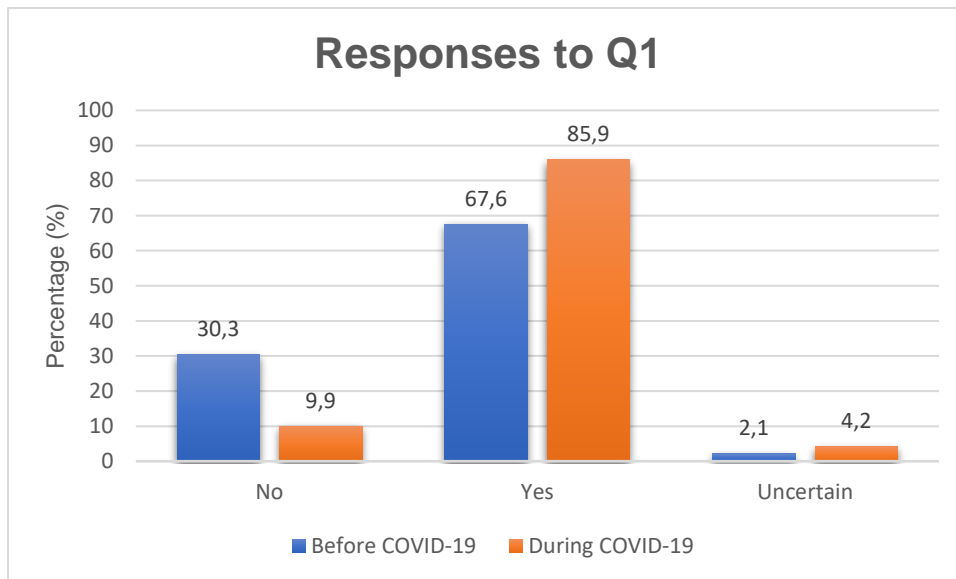


Figure 4. 7: Household responses to the question if households worried that they would not have enough food.

Source: Research Survey (2022)

The results to question one are depicted in Figure 4.7. The Figure above shows that, about 30.3% of families expressed little concern about running out of food prior to the COVID-19 pandemic. Additionally, it is shown that 67.6% of people were concerned about running out of food 30 days before the COVID-19 pandemic while 2.1% of households had doubts about having enough food in their households. Furthermore, Figure 4.7 demonstrates that during the COVID-19 pandemic, the percentage of households that were concerned about not having enough food to feed their families rose to 85.9%. There was a decline in the proportion of homes not concerned about running out of food during the pandemic, and this accounted for 9.9% of the households while 4.2% % stated being unsure of the situation of running out of food. Concerns over rising food costs during COVID-19 2021 were felt globally. In several nations, consumer food prices also increased, which raised worries that this could

result in an increase in food insecurity (IFPRI, 2021). According to Statistics South Africa (2020), during the COVID-19 pandemic, food insecurity was determined to be a significant issue for low-income and disadvantaged families. Additionally, the food crisis has worsened among households that already experienced food insecurity prior to the outbreak (Stats SA, 2020).

b. Response to HFIAS question 2

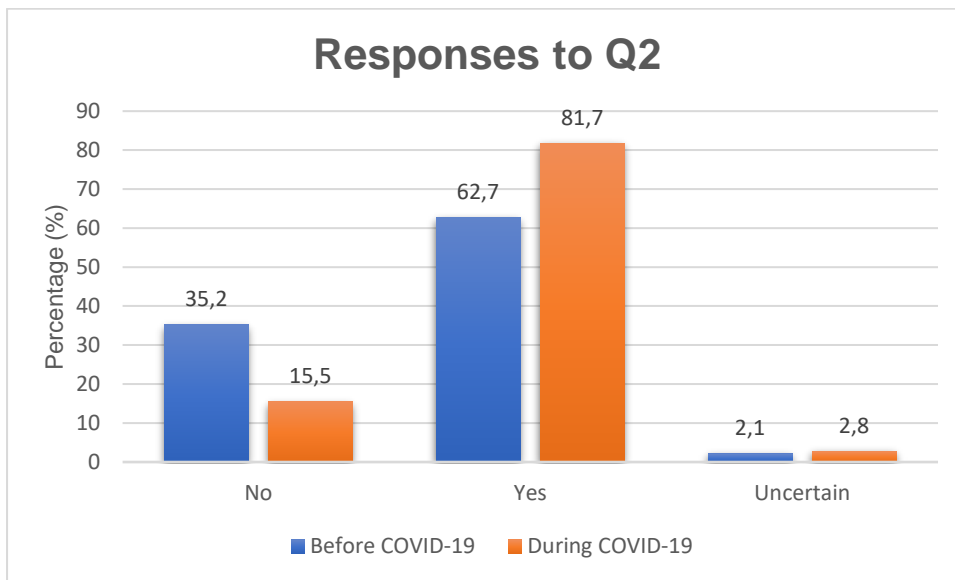


Figure 4. 8: Household responses to the availability of foods preferred due to lack of resources

Source: Research Survey (2022)

Approximately 35.2% of households had access to any type of food they wanted before to the COVID-19 outbreak, which was refuted by Figure 4.8 above. During COVID-19, the proportion of households that could eat whatever type of food they wanted only fell to 15%. This demonstrates clearly that 19.7% of the population had to sacrifice the food they preferred to buy food to survive. During the pandemic, a lot of homes were forced to alter their diets and consume enormous amounts of whatever was consumable and affordable. The statistic also shows that just 62.7% of the households were consuming meals they did not prefer prior to COVID-19. According to WFP (2020), food insecurity in the face of the COVID-19 pandemic is a reality that necessitates the development and implementation of mitigating strategies to always ensure adequate quality and safe food availability.

In developing countries, especially in Africa and Asia, the use of insects as food is most common, particularly in tropical and subtropical climatic environments where they are frequently consumed by the rural poor (van Huis *et al.*, 2013). This further implies that people in rural populace are not eating the food they desire but rather have been ingesting unsafe foods such as giant bullfrogs and unpasteurised milk before the pandemic. During the COVID-19 pandemic, this rate sharply jumped to 81.7%. Prior to COVID-19, just 2.1% of households were unsure about their choices, and this number only went up by 0.7% throughout the pandemic.

c. Responses to HFIAS question 3

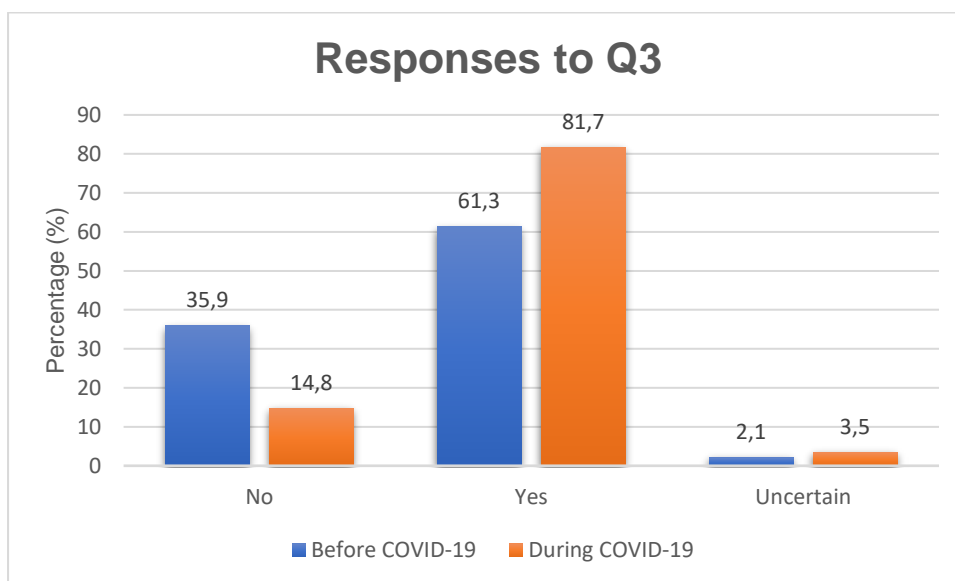


Figure 4. 9: Household responses to the availability of variety of foods due to limited resources

Source: Research Survey (2022)

Figure 4.9 demonstrates that during the COVID-19 pandemic, the proportion of households who were able to eat all different types of food they preferred decreased to 14.8% from 35.9%. Prior to the pandemic, about 61.3% of households only consumed a small variety of foods. This percentage increased during the pandemic when 81.7% of households were forced to eat a small variety of foods because they lacked finances to buy the foods they preferred. Such households disclosed that they gave up on food items like cheese, milk, sweets, fruits, and other proteins like meat to afford items like beans and maize. Approximately, 2.1% of households lacked clarity on the types of food they favoured, and the proportion marginally increased to 3.5% throughout the pandemic. According to Wang *et al.* (2020), this new condition caused

by the COVID-19 outbreak may have made it difficult to maintain a healthy and varied diet as well as regular physical activity. For example, limited access to daily grocery shopping may lead to a reduction in consumption of fresh foods, particularly fruits, vegetables, and fish, in favour of highly processed foods such as convenience foods, junk foods, snacks, and ready-to-eat cereals, all of which are high in fats, sugars, and salt. Furthermore, psychological and emotional reactions to the COVID-19 outbreak may increase the likelihood of developing dysfunctional eating habits (Wang *et al.*, 2020).

d. Responses to HFIAS question 4

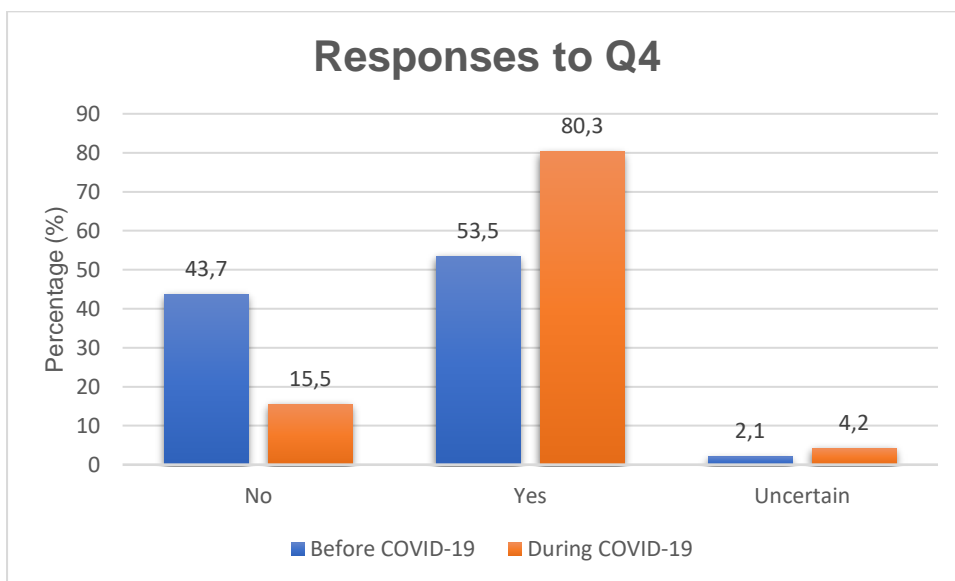


Figure 4. 10: Household responses to whether households ate the foods they really did not want to eat.

Source: Research Survey (2022)

Figure 4.10 shows that about 43.7% of the families did not consume meals they did not want to eat due to a lack of resources prior to the occurrence of COVID-19. Only 15.5% of households had access to the food they desired to eat during the pandemic. Only 53.5% of the households consumed meals they did not want to eat before COVID-19. During the pandemic, an increase of about 26.8% in the number of households consuming meals they did not want to eat was reported. People in Makhado’s rural areas were already eating to survive, thus, their concern was to keep the children fed. For instance, wild animals and indigenous plants are some of these

dietary sources in the municipality (Shackleton *et al.*, 2008). Only 2.1% of the people were unsure if they consumed the food they did not want to eat, and throughout the pandemic, this number marginally increased to 4.2%. The pandemic has drastically altered the food environment. Higher unemployment because of pandemic-related job losses, combined with disruptions in the food supply chain, has forced consumers to hunt for animals and harvest indigenous plants (Loopstra, 2020). Furthermore, according to Cawthorn (2015), wild meat, whether illegally or legally caught, can be an important, diverse, and scarce source of protein for the rural poor.

e. Responses to HFIAS question 5

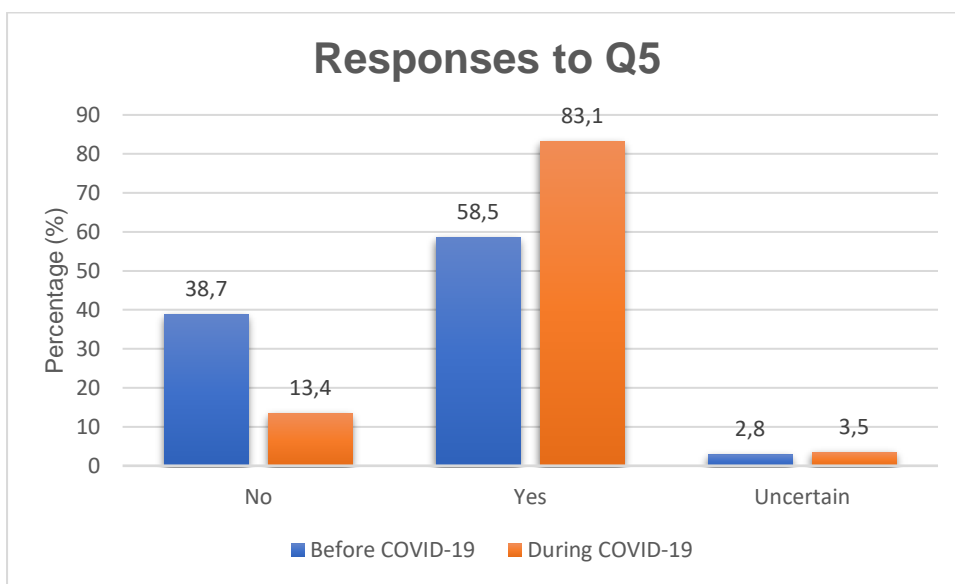


Figure 4. 11: Household response to food portions due to the availability of enough food

Source: Research Survey (2022)

According to the descriptive results, about 38.7% of households were eating enough food because there was enough to last the whole month. However, this number was decreased due to the COVID-19 pandemic, leaving only 13.4% of the population with enough food to eat for one person. The results also suggest that, even before COVID-19, people were undereating. Most households (58.5%) were eating less than they would want to feel satisfied. During the pandemic, the number of people consuming smaller than necessary portions of food increased and accounted for 83.1% of the households. A larger number of people who depend on a lower quantity of money make up the most of households. Most of this cash comes from social grants and money transfers from loved ones and friends. In South Africa, social grants directly

benefited an average of over 16 million poor people per month in 2014 (SASSA, 2014). This accounts for more than 30% of the country's population and more than 50% of households (Mabugu and Chitiga, 2013). According to Handa and Park (2011), social cash transfers are gaining traction in Africa as a tool for reducing inequality, social exclusion, and chronic poverty.

f. Responses to HFIAS question 6

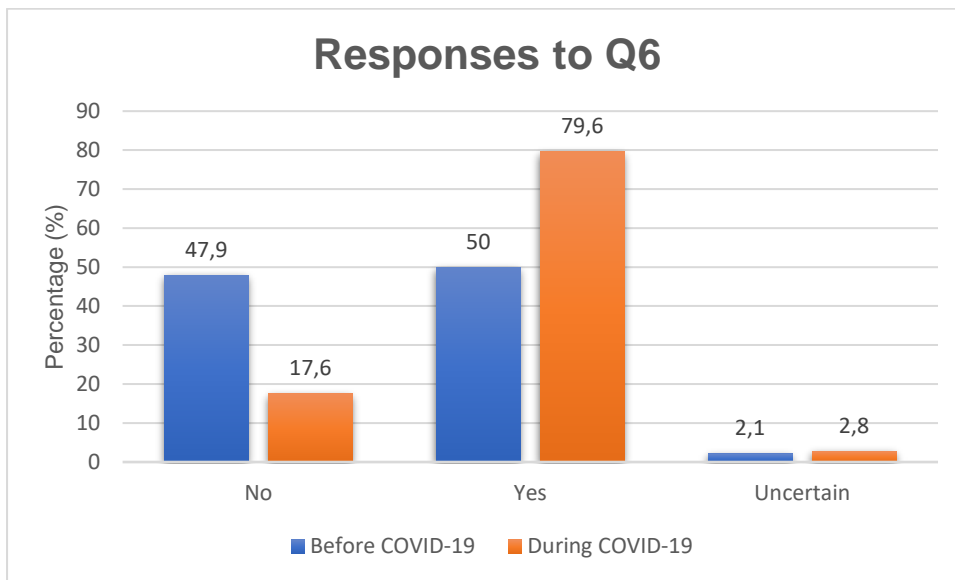


Figure 4. 12: Household responses to whether households ate fewer meals in a day to lack of resources

Source: Research Survey (2022)

Figure 4.12 shows that about 17.6% of the households during the pandemic ate enough meals in a day. The percentage of households eating fewer meals than three meals per day increased to 79.6% during the COVID-19 pandemic. For example, breakfast and dinner were listed as the most important meals by these households that are highly comprised. These modifications were necessary because of the pandemic's resource shortage. Due to the shutdown of food stores at the start of the pandemic, households said that they were concerned about food shortages. Only 50% agreed to eating fewer meals in a day due to the lack of enough food and 47.9% admitted to eating enough food before the COVID-19 pandemic. On the other hand, 2.1% of the households were uncertain if they ate fewer meals before the pandemic and 2.8% were uncertain if they ate fewer meals due to the lack of resources during the pandemic. Besides ill-health and death due to COVID-19, one of the most consequential welfare outcomes arising from disrupted production and lost income

could be reduced access to food (WFP, 2021). Risk perception associated with COVID-19 may influence people’s food purchase and consumption behaviours. For example, people may try to minimise the portion of food in an effort to minimise the risk of running out of food or do so to manage the little they have available (Bracale and Vaccaro, 2020)

g. Responses to HFIAS question 7

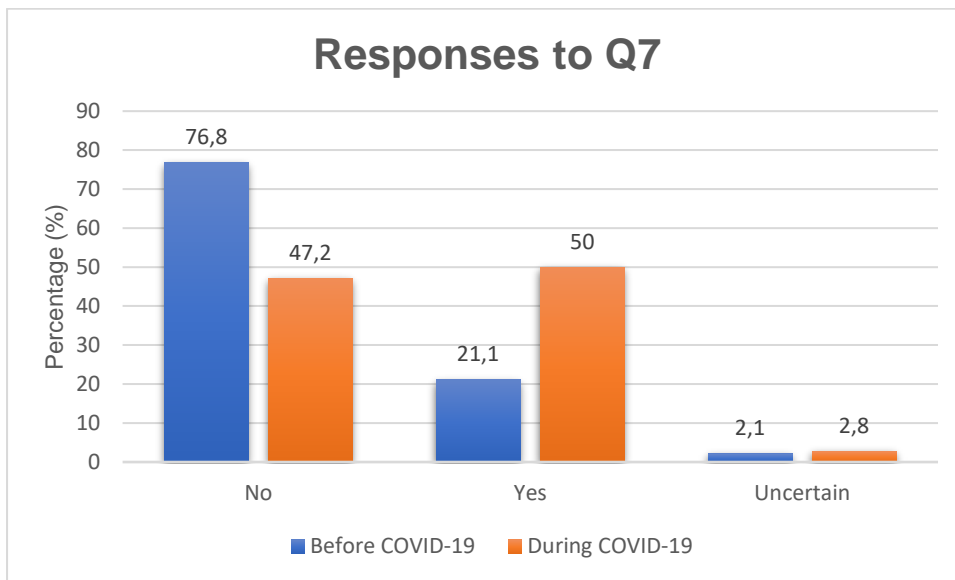


Figure 4. 13: Household responses to whether there was no food at all in the households due to lack of resources.

Source: Research Survey (2022)

According to Figure 4.13 above, more households (76.8%) had food and resources in their homes before COVID-19 of these households, and about 47.2% had the means to buy food during the pandemic. Only 21.1% of the households lacked any kind of food because they lacked the funds to buy food. The percentage significantly climbed during the pandemic, reaching 50% of the population. The individuals also stated that they lost their employment, and some even lost their breadwinners due to COVID-19. The respondents further stated that they could go more than 10 days without planning their meals. Food security, as defined by the World Food Summit in 1996, exists when all people have constant access to sufficient, safe, and nutritious food to meet their dietary needs for an active and healthy lifestyle. According to Stats SA (2020), food insecurity occurs when people’s access to food is insufficient and they struggle to meet their basic needs, whereas severe food insecurity occurs when there is a critical lack of access to food. Furthermore, as food insecurity worsens, the amount of food

consumed decreases and some meals are skipped. The most severe situation is characterised by hunger because of not being able to eat, and even not eating for an entire day because of the lack of money and other resources (Stats SA, 2020). The proportion of people who were unsure about the supply of food grew by 0.7%, from 2.1% to 2.8% during COVID-19.

h. Responses to the HFIAS question 8

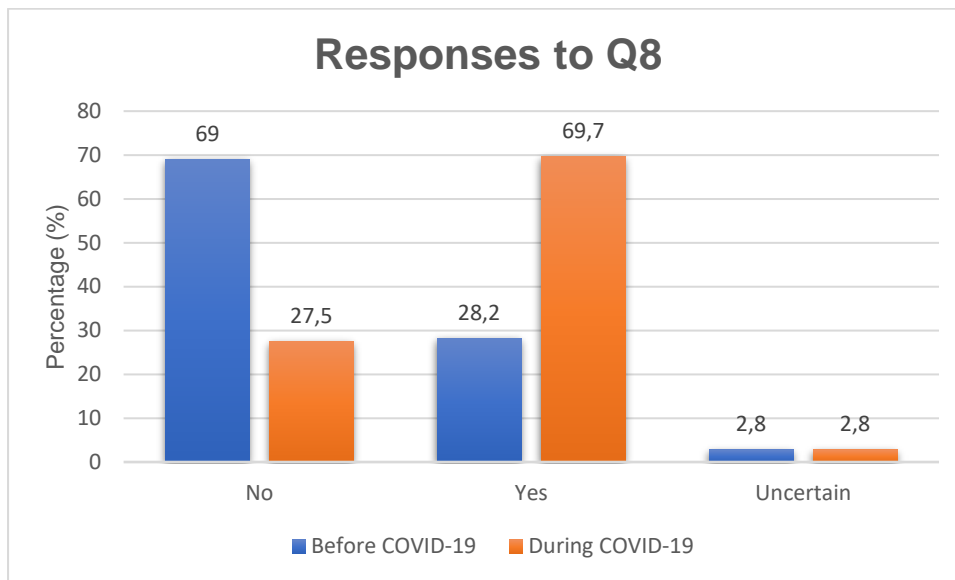


Figure 4. 14: Household responses to whether households went to sleep at night hungry because there were no resources to get more food.

Source: Research Survey (2022)

As indicated in Figure 4.14, approximately 69% of the households did not experience going to bed hungry prior to COVID-19 pandemic. Only 47.2% of the households were certain that no family member ever went to bed hungry throughout the pandemic unless it was due to personal choice and not a lack of food. Additionally, only 21.1% of households had a member who went to bed hungry because they lacked the means to buy food. During the COVID-19 pandemic, this percentage of people in the household going to bed hungry climbed to 69.7% and only 28.2% did not go to bed hungry. When there was insufficient food, most of households said that older individuals gave up their meals so that younger children could eat. The uncertainty continued, both before and during the pandemic. Those who were unsure if they ever went to bed hungry because of lack of resources accounted for 2.8%, both before the pandemic and during the pandemic.

i. Responses to the HFIAS question 9

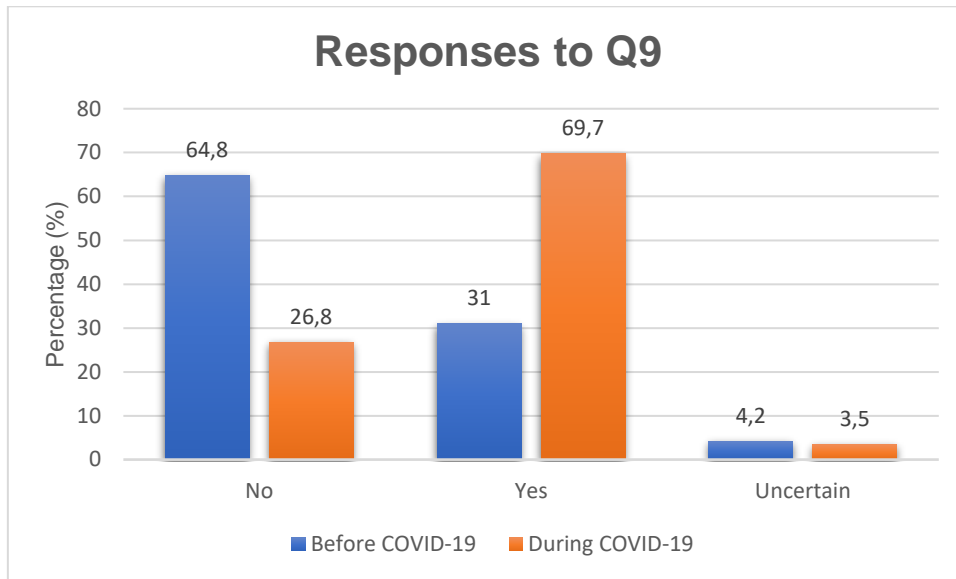


Figure 4. 15: Household responses to whether households spent the whole day without eating anything because there was not enough food.

Source: Research Survey (2022)

According to the descriptive results, approximately 64.8% of households had never gone an entire day without eating anything prior to the COVID-19 pandemic. The number of people who did not go the whole day without eating anything during COVID-19 was approximately 26.8%. Furthermore, it is evident that only 31% of people spent the whole day without eating anything prior to COVID-19. The COVID-19 pandemic caused the condition to worsen to 69.7% of households going the whole day without eating anything. Due to the scarcity of food, many families reported that they could go the entire day without eating. Before the pandemic, 4.2% of people were uncertain if they went the whole day without eating any meal due to the lack of resources to obtain food, while 3.5% of people were uncertain about going the whole day without eating throughout the pandemic.

4.3. Household dietary diversity score of food consumption groups of households

a. Food groups consumed by households before COVID-19

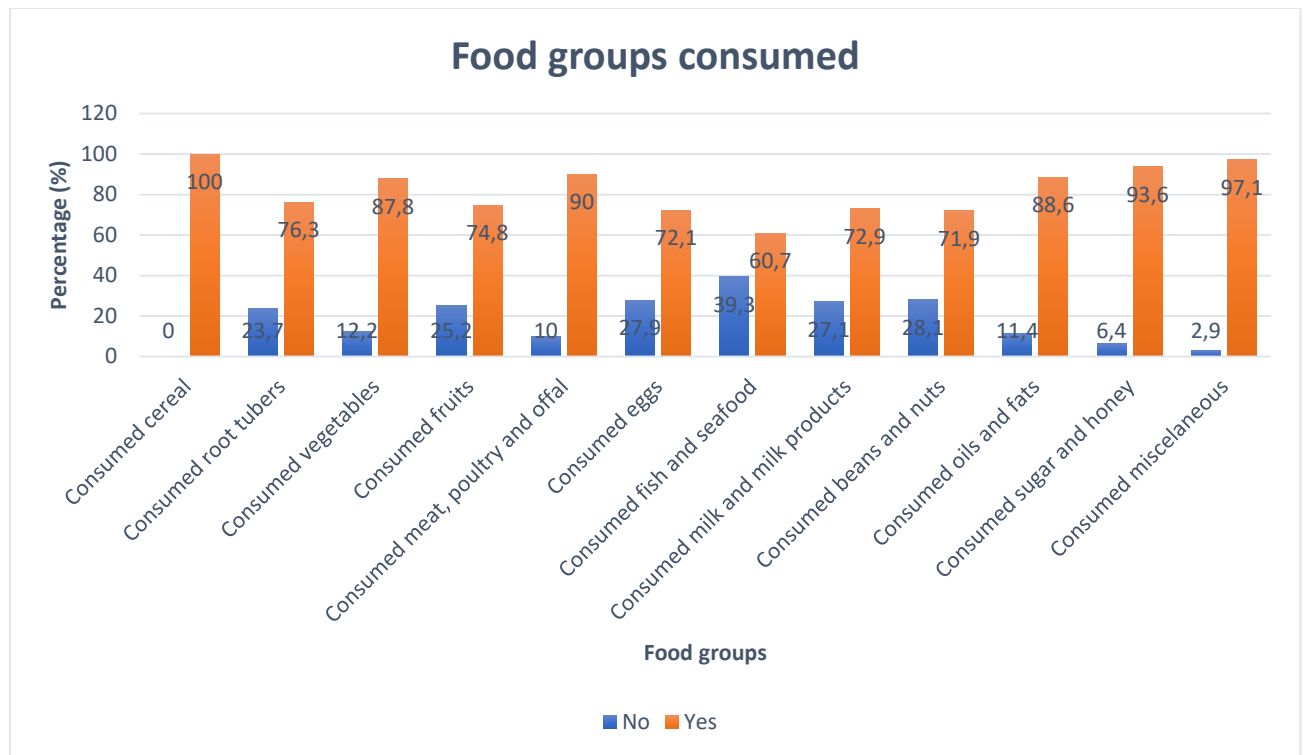


Figure 4. 16: Household consumption of food groups in the HDDS before COVID-19
Source: Research Survey (2022)

The consumption of households' patterns is influenced by factors such as preferences, habits, availability, tradition, culture, and income. Food consumption patterns are the repeated arrangements of consumption that are characterised by the types and quantities of food items and their combination in dishes and meals (Harris-Fry *et al.*, 2015). The study discovered that most of households were diversifying their diets, with many families eating more cereal, roots, tubers, vegetables, fruits, oil or fats, meat, poultry, and tea. Figure 4.16 shows that 100% of homes reported eating cereal prior to the COVID-19 pandemic, indicating that cereal is a household staple food. Miscellaneous foods (97.1%), sugar and honey (93.6%), meat, poultry, and offal (90%), fats and oils (88.6%), vegetables (87.8%), roots and tubers (83%), fruits (74.8%); milk and milk products (72.9%), eggs (72.1%), beans and nuts (71.9%), and fish and sea food (60.7%) make up the other major food groups that households consumed. According to FAO (2019), households spend 70% of their food budget on

cereals, dairy, sweeteners, and fats. Furthermore, wheat is the most abundant source of calories. Wheat accounts for nearly 52% of total calories consumed by low-income households. However, poor households spend more to obtain calories from wheat than non-poor households, both in urban and rural areas (FAO, 2019). Traditional food staples like rice and wheat tend to be classified foods in rural areas, which may have significant negative economic effects (FAO, 2019). However, because food consumption in these places is more strongly connected to purchasing power, nutritional deprivation among the poor can be worse than in rural areas. The typical tendency in rural areas is toward a higher diet of meat, vegetables, and fruit (IFPRI, 2020).

b. Food groups consumed by households during COVID-19

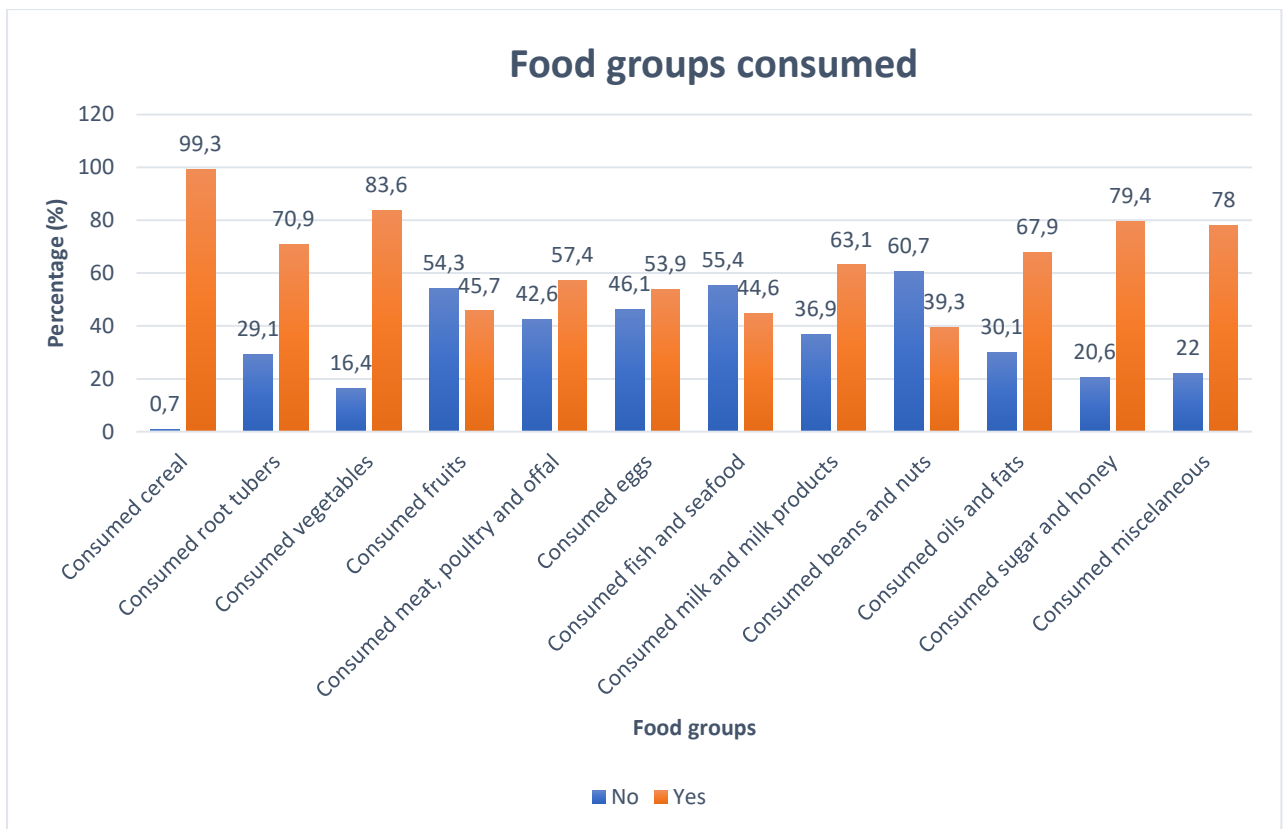


Figure 4. 17: Household consumption of food groups in the HDDS during COVID-19
 Source: Research Survey (2022)

Less preferred foods were generally cheaper in the study area; so, households purchased less preferred foods in abundance or as needed with less money. Furthermore, the concept of food security incorporates the phenomenon of ‘food preferences,’ so, if one is forced by circumstances to eat food that is less preferred,

hunger may be satisfied (physical and morphological), but satisfaction may not be attained (mental and psychological). Similarly, eating less preferred and cheaper food indicates that people's dietary diversity was low, and they were not eating fruits, meat, fish, milk, and pulses because these products are generally more expensive, and during food shortages, the cost rises even more, making people's accessibility much more difficult. Figure 4.16 shows how household consumption has changed because of the COVID-19. Cereal is the main staple food in 99.3% of households. Figure 4.16 further shows that the frequency of oils and fats decreased to 67.9% during the quarantine, which is very positive from the standpoint of health. This is supported by the fact that homemade dishes contain less salt and fat than processed foods. It is also encouraging to see that the frequency of stalk vegetables has increased to around 83.6%. Worryingly, the result is a 45.7% decrease in the frequency of fruits. Sugar and honey (79.4%), other (78%) and root tubers (70.9%), oils and fats (67.9%), milk and milk products (63.1%), meat, poultry, and offal (57.4%), and eggs (53.9%) were the other major food categories consumed in the previous seven days during COVID-19. Several food categories have been eliminated or reduced in consumption by households since the COVID-19 pandemic. This food group is made up of fish and seafood (44.6%) and beans and nuts (39.3%).

The COVID-19 pandemic is more than a health crisis; it is a disaster that affects the socioeconomic structures and social behaviours of societies around the world at both the micro and macro levels (United Nations, 2020a). According to studies, the COVID-19 virus, as well as the recommendations and restrictions put in place to combat it, have an impact on food purchasing and consumption behaviour (Sidor and Rzymiski, 2020; Pulighe and Lupia, 2020; Górnicka *et al.*, 2020). According to FAO (2020), due to the various effects of the global pandemic, overall global consumption was limited, while global dietary patterns changed. Almost all countries restricted and limited access to food markets, while restaurants and venues were closed. This had an impact on how people bought and consumed food. These factors also influenced food consumption patterns, favouring meal preparation, and eating at home (Petkovi, Popovski *et al.*, 2020). Furthermore, shipment restrictions resulted in potential shortages of some food products, particularly fresh fruits and vegetables, fish and fish products, and other perishable foods. Another economic factor was that many people

were exposed to limited earnings during the pandemic, which could have had an impact on global food consumption patterns.

4.4 Results of consumption coping strategies

When a family does not have enough food or enough money to buy food, the Coping Strategy Index (CSI) measures the extent to which the household uses unhealthy coping mechanisms (Coates *et al.*, 2006). The CSI tracks actions, or what people do when they do not have access to adequate food. The CSI can be used to assess the effectiveness of food support programmes, to predict coming food crises, to determine the need for food assistance, and to determine if food aid has been directed to the households with the greatest food insecurity (Coates *et al.*, 2006). The tool is used to determine which regions and demographic groups have the greatest requirements for food relief. Additionally, it can give insight on the frequently hidden causes of high malnutrition rates. Lastly, CSI is helpful for observing long-term patterns in food insecurity if coping mechanisms are followed over an extended period of time.

Table 4. 4: Consumption coping strategies patterns for households

Descriptive Statistics					
Consumption coping strategies	N	Minimum	Maximum	Mean	Std. Deviation
A. Rely on less preferred and less expensive foods	140	2	7	6.33	1.160
B. Eat the same meal everyday	140	0	7	4.22	2.071
C. Purchase foods on credit	140	0	7	2.67	2.164
D. Gather wild food, hunt, or harvest immature crops	140	0	7	1.18	2.015
E. Consume seed stock kept for next season	140	0	7	0.45	1.271
F. Limit portion size at meal time	140	0	7	5.27	1.762

G. restrict consumption by adult for small children to eat	140	0	7	3.86	2.325
H. Reduce number of meals eaten in a day	140	0	7	5.11	1.966
Total	140				

Source: Research Survey (2022)

The patterns of consumption coping mechanisms for households are displayed in Table 4.4 above. Households first alter their nutrition. For instance, households may substitute more preferred to less expensive and less preferred foods when consuming food. The table shows that households depended on less preferred and less costly foods since the hit of COVID-19 pandemic. The figures also show that households may survive for the entire week on less expensive and less preferred items. Additionally, households rely on less expensive and less popular items for an average of six days per week. These findings clearly show that households' main coping mechanism is turning to less expensive and less popular foods. Households who always eat the same meal do so for a minimum of zero day and a maximum of seven days. Four days was the mean average number of days that households ate the same meal. The households tried to increase their food sources using a short-term technique that is not long-term viable. This also extends to credit-based borrowing and purchases. According to the table, households had a minimum of zero day and a maximum of seven days when they bought food on credit, with an average of two days. In desperate situations, some households hunted or harvested immature crops, locally sourced for wild food, or ate stored seed stock. People who used this strategy did so for a maximum of seven days and on average once throughout the previous seven days. Additionally, households attempted to cope with food shortage by rationing the food they had on available and reducing the quantity of their meal portions. In the previous seven days, this had a maximum of seven days and an average of five days. With an average of about four days, households could only allow adult consumption for young children to eat for a total of seven days. Additionally, households reduced the number of meals consumed each day to favour some members of the household over others. The maximum of seven days and an average of roughly five days over

the previous seven days accounted for this. When food supplies are scarce, household members resort to coping strategies that force them to reduce the quality and quantity of foods consumed (Mason *et al.*, 2015). Furthermore, coping strategies involved compromising the quality and quantity of food consumed are the first steps taken to mitigate the negative effects of food scarcity at the household level. To protect their basic needs during the phase of idiosyncratic shocks such as food price increases or natural disasters, households may employ food or non-food based coping strategies or a combination of the two (FAO, 2018). Furthermore, theoretical predictions indicate that poor households will do everything possible to maintain or smooth food consumption. When faced with reduced income, they will reduce their consumption of other goods first, and they may also resort to crisis-level coping strategies such as selling assets to maintain food consumption, even if this has long-term welfare consequences (UN, 2020).

Table 4. 5: descriptive statistics of coping strategies available for the households

Descriptive statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Households	140	1	140	70.50	40.559
Dietary change	140	0	1	.98	.145
Increase short-term household food availability	140	0	10	3.94	2.700
Rationing strategies	140	0	9	6.12	2.020

Source: Research Survey (2022)

Coping strategies are the methods used by households in a systematic and sequential manner to reduce the risk and shocks associated with food scarcity (Mbwana *et al.*, 2016). Normally, households experiencing food scarcity do not become hopeless and simply wait for the situation to pass; instead, they fight the situation and engage in food-acquiring activities or change their eating habits; these responses are known as food-coping-strategies (Ntwenya *et al.*, 2015). Borrowing food from relatives and friends, purchasing food on credit, withdrawing children from school, selling farm implements, begging for food, and selling household assets are also strategies used by households to increase food security. Rationing was the most common first-ranking coping strategy among households. Most households (83.1%) were eating less than they needed to feel satisfied. Swapped consumption to less preferred and cheaper

food was the second most popular coping strategy among households during the period of COVID-19 food insecurity. As a means of dealing with food shortages, nearly four-fifths (81.7%) of households reported consuming meals they did not want to eat to foods that were less preferred and cheaper at least once per week. Initially, during a food shortage, households compromise on food quality by purchasing less expensive and less preferred foods, but they do not compromise on food quantity. Food quantity declines later in the process as food insecurity worsens (UN, 2020). The third household strategy was to increase short-term household food availability. This includes borrowing money and food, reducing the quantity and quality of foods eaten, and increasing household production. During the occurrence of COVID-19, approximately 80.3% of households consumed meals they did not want to eat. Poor rural households lack appropriate access to credit in developing nations. Many professionals in the field of development think that this economic crisis has detrimental effects on poor people's access to food, health, and general household welfare (FAO, 2019). Better credit availability will assist low-income rural households in increasing food availability, engaging in more productive income-generating activities, and raising their standard of living (IFPRI, 2021). The World Bank has recently adopted financial capital in the form of lending as a central approach to reduce poverty, and it has proven to be an effective tool against poverty and food security (WHO, 2020a).

4.5: Multiple Linear Regression Estimates

Table 4. 6: Results of multiple linear regression estimates using HFIAS before COVID-19

Variables	Beta	T values	Sig.	VIF
Constant	.780	.856	.393	-
Household income	.116	1.996	.028**	1.068
Household size	.038	1.877	.088***	1.093
Age	1.731	1.079	.553	1.430
Gender	-.103	1.902	.015*	1.122
Marital status	.178	1.740	.084***	1.181
Sources of income	.119	1.321	.334	1.464
Employment status	-.075	-2.940	.075***	1.367
Model summary: R square= 0.632 Adjusted R square = 0.563 F- value = 8. 725				

*=1% Significance level; **= 5% Significance level; ***=10% Significance level.

Source: Research Survey (2022)

Significant variables

At 5% level of significance, the coefficient of monthly household income was positive, with 0.028 p-value. This implies that the higher the household income, the more likely the household was food secure prior to the occurrence of COVID-19. This is because the patterns of quality and quantity of household expenditure depend on income level, and higher income leads to increased food access. The findings are consistent with those of Bashir *et al.*, (2012), who discovered a positive relationship between household income and food security. Low-income households are more likely to be food insecure than middle-income households (Jacobs, 2010).

Household size had a positive influence on the HFIAS, at 10% significance level. This means that the larger the household, the more likely it is that the household will be food secure. This could be one of the reasons why larger households tend to share household activities, which could lead to such households engaging in activities such as farming for household consumption and other income-generating activities. The results contradict the findings of Bryan *et al.*, (2013), which found a negative relationship between larger household size and food security status. It was concluded that this is because having many dependents in the household makes the household food insecure, especially when most of the dependents in the household are children or unemployed people.

The gender coefficient was found to be positive at 1% significance level in relation to household's food security status. This suggests that male-headed households are more likely to be food secure than female-headed households. Gender is an important factor in determining household food security. Male-headed households are less affected by food insecurity than female-headed households. As a result, female-headed households are more likely to experience food insecurity. According to Adebo and Falowo (2015), male-headed households are more food secure than female-headed households because male household heads are not limited to job opportunities in their immediate environment, whereas childbearing and housekeeping may limit food security among female household heads. The findings contradict Tarvinga's (2013) findings, which indicated a negative relationship between food security and the gender variable. The study, however, agrees with the findings of

Ahmed *et al.*, (2015), which show a positive relationship between food security and the gender variable.

Marital status was positively significant at 10% significance level. This indicates that households headed by married people are more likely to be food secure than households headed by unmarried people (divorced, widowed, single). This can occur because of the couple's joint decisions and sharing of household responsibilities, which means that if the couple is employed, household income will likely increase because household expenses will be shared among the couple, increasing the likelihood of the household being food secure. These findings contradict those of Adebo and Falowo (2015), who discovered that food security was related to the marital status of the household head.

The employment status of the household head had a negative relationship with the food security status of the household, which is significant at 10% level. The negative coefficient could be explaining that, as the number of employed members in a household increase, such households may face moderate food insecurity. This could be one of the reasons why such households do not have enough money to buy nutritious food, as such, household members may lack skills that would help them obtain appropriate jobs. However, the findings contradict Arene and Anyaeji's (2010) findings, which regard unemployment as one of the major determinants of poverty within the study's geographical boundaries. According to Arene and Anyaeji (2010), employed household heads have higher levels of food security than unemployed household heads. The higher the unemployment rate and the lower the living wage, the more likely households are to be food insecure.

Table 4. 7: Results of multiple linear regression estimates using HFIAS during COVID-19

Variables	Beta	T values	Sig.	VIF
Constant	.101	.656	.513	-
Household income	.370	2.166	.014*	1.087
Household size	-.143	-1.940	.110	1.317
Age	.158	2.303	.023**	1.815
Gender	.035	3.902	.001*	1.051
Marital status	.048	1.490	.815	1.530
Sources of income	.329	2.415	.023**	1.317
Employment status	-.188	-4.213	.010*	1.001
Model summary:				

R square= 0.683 Adjusted R square = 0.601 F- value = 9. 118

*=1% Significance level; **= 5% Significance level.

Source: Research Survey (2022)

Significant Variables

At 1% significance level, there was a positive relationship between the households' food security intensity and household income. The coefficient is highly positive, implying that households with income are more likely to achieve food security than those without. Furthermore, because such households have more purchasing power, households with an income source can diversify their diet. Job losses have been concentrated among people living in low-income households during COVID-19, and the resulting income declines have made many individuals and families vulnerable to food insecurity. A higher income allows households to make decisions about where and how to buy food, and it allows households to differ on food options that may not be available to those with lower income. According to Maxwell (2016), food poverty lines are typically drawn based on how much income is required to meet basic food needs.

Age is statistically significant at 5% level with a positive coefficient. This means that during COVID-19, the older the household head, the more likely the household will be food secure. According to Leung and Wolfson (2020) the likelihood of food insecurity decreases with age because older people have more experience in subsistence agriculture and can accumulate more wealth. Similar findings by Apanovich and Mazur (2018) suggested that age has a positive relationship with household food security status. Furthermore, old age brings with it new experiences and knowledge in terms of food production for household consumption and the type of food that can be stored in larger quantities for longer periods.

The gender variable was found to be significant at the 1% level and to have a positive relationship with the household's food security status. This means that the likelihood of food security decreases when a female heads a household versus a male head a household. Due to their significant involvement in household chores such as cleaning and cooking, female heads typically have less time for market work, leading them to

prefer more leisure or lower-paying jobs that allow them more time to perform household chores (Mabugu *et al.*, 2013). The findings contradict Taruvinga's (2013) findings, which indicated a negative relationship between food security and the gender variable. Furthermore, the findings suggest that female-headed households are more likely to achieve food security than male-headed households. The findings of this study agree with those of Apanovich and Mazur (2018) which show a positive relationship between food security and the gender coefficient.

The variable sources of income were found to be significant at 5% level and have a positive relationship with the food security status of the household. This implies that sources of income activities increase the likelihood of food security in the household. According to FAO (2019), economic diversification gives a household something to fall back on when crops fail. These economic resources from off-farm activities improve households' ability to secure food, lowering the risk of food shortages. Research conducted in Molati village in Limpopo, South Africa, discovered that, while smallholder farmers are involved in household food production, they are frequently left with food deficits to carry them through to the next harvest and would require off-farm income to buy food for the household (Bashir *et al.*, 2012).

The employment status of the household head has a positive relationship with the food security status of the household. At the 1% level, this variable was found to be negatively and statistically significant. This could be due to such households not having sources of income, or if they do, the sources of income limit their ability to acquire enough food to meet the daily food requirements of the household. As a result, households encounter food shortages and are vulnerable to food insecurity shocks. These findings imply that households with fewer or no employed members are more likely to experience severe food insecurity. Bashir *et al.*, (2012) discovered similar findings, arguing that the higher the unemployment rate, the lower the living wage and the more likely households are to be food insecure.

Table 4.8: Results of multiple linear regression estimates before COVID-19 using HDDS

Variables	Std Error	Beta	T values	Sig.
Constant	1.402	11.893	8.480	0.001
Employment Status	0.401	0.862	2.148	0.068**
Income Source	0.080	-0.171	2.139	0.034*
Household Size	0.046	-0.078	-1.696	0.092**
Amount	0.000	0.000	-1.64	0.103
Credit	0.627	-1.061	-1.693	0.093**
ANOVA Regression: Sum of squares = 23.955 df = 5 Mean Square = 4.791 F- value = 2.315 Sig. = 0.047				

*=1% Significance level; **= 5% Significance level.

Significant Variables:

At 5% significance level, the employment status of the household head was positively and significantly associated with the food availability of rural households. In other words, if the household head works full-time, the income is less likely to fall completely. Previous research by FAO *et al.*, (2020) confirmed the employment status of the household head as a determinant of food security. Food shortages are more likely in households with an unemployed head of household who has no fixed income or no income at all (IFAD, 2021). Furthermore, due to lack of sufficient income, these households' purchasing power is reduced, and they do not have adequate access to food. FAO (2020) assumed that as food prices rise, overall global consumption will be limited, while global dietary patterns will change. This means that employed heads of households will have access to grocery shopping, which will lead to the consumption of preferred fresh foods, particularly fruits, vegetables, and fish, rather than highly processed convenience foods like snacks and junk foods.

The variable household income is positive and statistically significant at 1% level. Increased household income improves food availability because more food can be produced or purchased. In terms of food accessibility, household income is the most important determinant of household food availability. As a result, their income can have a significant impact on the household's economic accessibility. Bashir *et al.*,

(2012) discovered that higher-income households have greater food security because they have more options for purchasing household food. Furthermore, as income grows, so does household purchasing power, and they can prepare more food to meet their nutritional needs.

Household size had a negative influence on HDDS, which was 5% significant. Increases in household size result in increased food expenditure, and because some household members do not contribute to any income and thus increase the household's dependency ratio, the likelihood that food availability would decrease as household size increased was high. The findings are consistent with previous research that found a negative relationship between larger household size and food security status (Amaza *et al.*, 2012). It was concluded that this is because having many dependents in the household makes the household food insecure, especially when most of the dependents in the household are children or unemployed people.

Credit availability was significant at 5%, and it is negatively related to the HDDS. This implies that the greater a household's access to credit, the less food is available. This is indicated by the assumption that funds obtained through credit access may be directed to purposes other than food purchases. The findings of Amaza *et al.*, (2012) contradict the findings that access to credit improves the food security status of households.

Table 4. 9: Results of multiple linear regression estimates during COVID-19 using HDDS

Variables	Std Error	Beta	T values	Sig.
(Constant)	1.111		9.046	0.001
Gender	0.309	-0.109	-1.267	0.207
Assistant	0.354	-0.128	-1.492	0.138
Amount	0.000	-0.185	-2.117	0.036**
Age	0.011	-0.087	-0.999	0.320
ANOVA Regression: Sum of squares = 19.511 df = 4 Mean Square = 4.878 F- value = 1.693 Sig. = 0.155				

**=5% Significance level

Amount of credit

At 5% significance level, the amount of credit received by the household was negatively associated with food security of rural households. This implies that the lower the amount of credit received by household, the more food insecure the household will be. This is contrary to the finding by Bryan *et al.*, (2013), who state that one contribution of access to credit concerns household consumption. While acting as an alternative source of income, credit can enable households to achieve greater caloric intake via larger meal portions or additional meals.

4.6 Discussion

The primary objective of this research was to examine how COVID-19 induced restrictions affected rural household food security in the Limpopo Province's MLM. The HFIAS score had a strong correlation with the explanatory variables, which included gender, age, household size, marital status, household income, marital status, and income source. There was no significant relationship between credit, education, and the HFIAS score. Households headed by married people were more food secure than those headed by unmarried people. This can happen as a result of the couple's joint decisions and sharing of household responsibilities, which means that if the couple works, household income will likely increase because household expenses will be shared between the couple.

According to the HFIAS measure, 85.9% of people were concerned about running out of food after 30 days during the COVID-19 pandemic. Approximately 30.3% of families were unconcerned about running out of food, while only 2.1% were unsure of their food situation. These results are supported by the findings of recent studies on the problem of food insecurity faced by low-income and poor suburban households (HLPE, 2020 and FAO, 2020). Households with a household member(s) who went to bed hungry at night due to a lack of food occurred in 69% of the households, and 85.9% of households reported anxiety and uncertainty about household food supply, while 80.3% of households had insufficient food quality.

The research found that the gender of the head was directly related to food security and dietary diversity, and that female-headed households were more likely to be food insecure. Females made up 64.6% of the population in most households, while males made up only 35.4%. Furthermore, most female-headed rural households lacked access to information and natural resources, which had a significant impact on rising

food insecurity. According to Laborde *et al.*, (2020), women are more likely to be in precarious positions, earn lower incomes, and are more vulnerable to stress and violence. As a result, gender-sensitive social protection intervention design and implementation are critical to ensuring that rural women can participate in and benefit equally from these interventions (HLPE, 2020).

The results also revealed that 81.9% of household members were unemployed, with only 18.1% working in a formal capacity. Protein consumption increased as income increased, while plant protein consumption decreased as income increased. Food insecurity was more prevalent among low-income people than among lower-middle to high-income people. The results on rural household dietary diversity revealed that consumption of some food groups changed during the COVID-19 pandemic. During the COVID-19 pandemic, household consumption of meat, fruits, and eggs decreased. The results are consistent with the findings of several recent studies that found rapid changes in diets and food consumption habits during the COVID-19 pandemic (Wu *et al.*, 2020). Furthermore, the findings revealed that consumption of cereals and legumes increased among rural households during COVID-19. As a result, serious government oversight is required to control food prices; protein sources should be affordable to people, particularly vulnerable groups. During a pandemic, it is critical to have a properly functioning immune system, which the body uses to fight disease in the case of infections such as COVID-19. These results are supported by the findings of a previous FAO (2021) study that legumes are preferred as a cheaper source of protein in rural households. Legumes are a low-cost alternative to meat, milk, and eggs. The variable sources of income were found to be significant and to have a positive relationship with the household's food security status. This implies that activities that generate income increase the likelihood of food security in the household.

Nutritional knowledge is essential for improving food security during an pandemic (Bhatt, 2020). Improvements in the head of the household's nutrition knowledge could assist a family in identifying which behaviour and reaction are appropriate during the pandemic, and thus, the greater the effect of this factor on food security and dietary diversity once the virus began spreading. According to some studies, a lack of nutrition knowledge resulted in a decrease in dietary diversity (Sidor, and Piotr, 2020). Acknowledging social determinants and nutrition status is critical for determining the

best ways to cope with the various detrimental consequences of pandemic diseases such as COVID-19 on health status in the municipality. Most developing countries faced numerous economic, financial, social, and political challenges; thus, identifying associated factors with food security may aid policymakers, nutritionists, and health experts in managing the catastrophic issues during the COVID-19 outbreak.

CHAPTER FIVE

RESEARCH SUMMARY, CONCLUSIONS, POLICY RECOMMENDATIONS AND LIMITATIONS OF THE STUDY

5.0 Introduction

The fundamental conclusions of the study are outlined in this chapter, which also draw conclusions based on the results presented and discussed in the previous chapter. The recommendations and conclusions are based on the study's findings that the regression analysis produced, and they include recommendations for improving food security.

5.1 Research Summary

This study examined the effects of COVID-19 induced restrictions on rural household food security in the local municipality of Makhado in the Limpopo Province. The study collected and analysed primary data that were gathered from a sample of 139 rural families in the MLM using structured questionnaires. The study had four objectives.

The first objective was to identify and describe socio-economic characteristics of rural households at Makhado local municipality. The second objective of the study was to examine and characterise food security status of rural households at MLM. The fundamental hypothesis of this objective was that socio-economic factors are not determinants of the availability of food security in households. The HFIAS and HDDS measures were used to assess household food security. The HFIAS was used to determine the level of food insecurity for each individual household in the MLM. Before COVID-19, the HFIAS regression results showed that household income, household size, gender of the household head, marital status of the household head, and employment status were important variables in determining household food security. The HDDS results also revealed a close relationship between food utilisation and household demographic variables such as employment status, income source, household size, and credit access prior to COVID-19. The HFIAS score during COVID-19 had a clear correlation with the explanatory variables, which included household income, age, gender, household income, source of income, and employment status. The results of the HDDS analysis during COVID-19 revealed that the amount of credit was related to household food availability and utilisation.

The third objective was to examine and describe consumption strategies used by households in MLM to obtain food in the presence of induced COVID-19 restrictions. The primary hypothesis for this objective was that COVID-19-induced restrictions had no effect on household consumption patterns or the household's ability to obtain food. The most common first-ranking consumption strategy among households was rationing. Most households (83.1%) ate less than they needed to feel satisfied. Consumption of less preferred and less expensive foods was the second most popular coping strategy among households during the COVID-19 food insecurity period. As a means of dealing with food shortages, nearly four-fifths (81.7%) of households reported consuming meals they did not want to eat to foods that were less preferred and cheaper at least once per week. During the occurrence of COVID-19, approximately 80.3% of households consumed meals they did not want to eat. Furthermore, coping strategies involving compromising the quality and quantity of food consumed were the first steps taken to mitigate the negative effects of food scarcity at the rural household level at MLM.

Lastly, the research investigated and analysed the effects of COVID-19-induced restrictions on rural household food security in MLM. The central hypothesis for this objective was that COVID-19-induced restrictions had no effect on rural household food security. Prior to COVID-19, most households were diversifying their diets, with many families eating more cereal, roots, tubers, vegetables, fruits, oil or fats, meat, poultry, and tea. According to the study's findings, several food categories have been removed or reduced in household consumption since the COVID-19 pandemic. In 99.3% of households, cereal was the main staple food. It was also discovered that when consumption frequency was higher prior to the pandemic, a decrease in consumption was more likely to occur. That is, higher baseline consumption levels were associated with a higher likelihood of reported decreases in consumption during COVID-19. Fruits and vegetables were an exception in that a decrease in consumption was not significantly related to consumption levels prior to the pandemic. Descriptive statistics were used, which included the use of tables, frequencies, and charts to analyse, summarise, and describe socioeconomic characteristics (objectives one and four). Objective two examined using the Household Food Insecurity Access Scale (HFIAS) and Household Dietary Diversity (HDD). The Coping Strategy Index (CSI) examined the third objective.

5.2 Conclusion

The study's findings confirm that socioeconomic characteristics of a household have the greatest influence on rural household food security. Furthermore, COVID-19-induced restrictions had an effect at MLM households' food security. As a result, the study rejects the hypothesis because COVID-19-induced restrictions and socioeconomic factors influence household food security. According to the findings of the study, food insecurity increased among rural households during the COVID-19 pandemic and were concerned about not having enough food. The first purpose of this study was to examine the impact of COVID-19-induced restrictions on rural households' ability to obtain food. The results from the sampled households showed some variations in food security caused by COVID-19. Most rural households in MLM were clearly food insecure, which was exacerbated by the socioeconomic effects of poverty and unemployment. The COVID-19 pandemic, which has been observed around the world, has added an additional layer of vulnerability to households. The COVID-19 pandemic robbed many South Africans of their constitutionally protected right to sufficient food, weakening efforts to achieve "Zero Hunger" by 2030 under the National Development Plan and the United Nations Sustainable Development Goals (SDGs).

The second objective of the study was to determine the relationships between household socioeconomic and demographic variables and their levels of food (in)security. The results reveal a significant unemployment rate and low-income status rate, as most members of the households depended on social grants for income, severely limiting the extent of household food security. According to the findings, unemployment and a decrease in household income are associated with an increased risk of food insecurity. When the number of unemployed members increases, so does the number of people who report sleeping hungry. The study also showed that having a male household head decreases the number of household members who report 'not enough food.' This study sheds light on the reality and severity of household food insecurity in low-income rural MLM households, which cannot be overlooked. Many rural households' incomes have been reduced as a result of quarantine and business closures. Access to valuable foods has been reduced and replaced by high-calorie, low-value foods, resulting in obesity and cell starvation, putting rural people at

increased risk for coronavirus disease and other diseases. As a result, the government can solve this problem by enacting appropriate policies and allocating subsidies to lower-income deciles, allowing protein and micronutrient sources to enter people's food baskets.

5.3 Recommendations

Based on the study reviews and results analysis, it is suggested that the development of solutions to alleviate food insecurity be guided by these key findings. The first policy shift is an overall transformation of food systems. In practice, this involves changing from a singular focus on increasing food supply through specialised production and export to significant developments that diversify food systems, assist, and support marginalised and disadvantaged groups, and enhance sustainability throughout all aspects of food supply chains, from manufacturing to consumption. As the nature of the pandemic's food security and nutrition impact demonstrates, increased food production alone will not be enough to address this crisis. The government must provide adequate emergency food aid, using local and regional purchasing whenever possible. For accountability, the government should put in place measures to track the supportive and contributions sourced for the most vulnerable in Makhado local municipality, especially since evidence has shown that these supplies and food items in most cases ended up in the hands of politicians and members of the party. As a result, the government must treat the issue of systemic corruption with the level of urgency it deserves.

According to the findings of the study, employment is an important factor in ensuring household food security. Remittances have been discovered to be a critical tool for many households in the research area, and increased concentrations of remittances can significantly alleviate food insecurity and the implications of income inequality. Policymakers in emerging economies can focus on ensuring job security to mitigate the negative effects of income inequality while lowering remittance transaction costs.

income have the potential to increase dietary diversity while also addressing food insecurity issues. Even so, the shutdown regulations imposed to stop the virus's spread had serious unintended consequences. Because informal food vendors were initially excluded as essential services, many vulnerable households in the study area were unable to obtain fresh fruits and vegetables. It is suggested that the government

concentrate on increasing household or individual income, economic growth, and adding adequate resources to alleviate food insecurity by protecting employment and incomes, as well as protecting informal business businesses that have been forced to close due to restrictions.

While the government made a priority preventing the spread of COVID-19 disease, it was also critical to ensure people had both physical and economic access to food. For instance, closing schools led to children who rely on the school feeding program at risk of going hungry. For instance, more emphasis should be placed on the implementation of feeding schemes to decrease the burden on the poor while also making it easier for youths to attend school. When schools are closed, there must be a provision of alternatives to school lunch programmes whenever possible.

A one-year increase in the age of the household head was associated with a 5% increase in the likelihood of food security. There is a strong correlation between age and wealth accumulation. All innovation stakeholders, including rural recipients, must be involved at every step of improving rural livelihoods. This means that even youths and elders, including women, must be responsible for identifying problems, formulating solutions, developing realistic plans to achieve these goals, and carrying them out. This is because youths are the ones who are unemployed and rely on the government unemployment grant as a source of income.

The findings indicate that female-headed households are less likely to be food secure. The study considered the fact that female-headed households have high dependency ratios, which increases the burden of providing for an increased number of family members. The government's policy of universal access to education must be fully implemented. This can be accomplished by closely monitoring the policy and its strategies. It is suggested that relevant stakeholders prioritize rural women's empowerment through adequate access to and implementation of free Adult Education and Training programs. Investing in and developing rural women's competences will improve their marketing, social, economic, and strategic planning framework. Women who are empowered contribute to their households' income and become effective transformational leaders in their communities.

Food security is fundamental to Section 27 1(b) of South Africa's Bill of Rights. According to the Constitution, every individual is entitled to adequate water and food.

South Africa has been said to utilize one of the world's best policy design approaches. For example, the innovative social grants system is an example of concrete proof policy success. National and local policy designs must be strengthened to ensure better implementation of these policies. In addition to economic policy reforms to boost the economy, feasible strategies and approaches to address poverty and inequality are required. It must be acknowledged that poverty must be alleviated before it can be eliminated.

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APPENDIX A: Consent form

University of Limpopo

CONSENT TO PARTICIPATE IN RESEARCH

TITLE OF RESEARCH PROJECT: An analysis of the effect of COVID-19 induced restrictions on rural households' food security: the case of Makhado local municipality, Limpopo province.

Dear Participant,

You are requested to participate in above mentioned research study conducted by (Department of Agricultural Economics and Animal production, University of Limpopo). You were selected as a participant in this study because your household fall under Makhado Local Municipality.

1.PURPOSE OF THE STUDY

This research project aims to identify and describe socio-economic characteristics of rural households, to identify and describe food security status of rural households, and describe challenges faced by households to obtain food in the presence of induced COVID-19 restrictions at Makhado local municipality.

2.PROCEDURES

As the investigator I would like you volunteer to participate in this study where I would request you to Agree to be interviewed in person by me. Request you to respond to questions on socio-economic characteristics, describe challenges that you face in order to obtain food in the presence of induced Covid-19 restrictions.

3.POTENTIAL BENEFITS TO SUBJECTS AND/OR TO SOCIETY

This research will help in identifying challenges that make rural households to be food insecure and establish possible solutions to food insecurity at household level. I will highly appreciate your cooperation while your participation is voluntary.

4.CONFIDENTIALITY

Information obtained from the participants during the study will remain confidential and will be disclosed only with your permission. Confidentiality of all the research data will be maintained by the investigator and identity of the respondents will not be revealed in the research report.

5.PARTICIPATION AND WITHDRAWAL

You can choose whether to participate in this study or not. If you volunteer to be in this study, you may withdraw at any time without consequences of any kind. You may also refuse to answer any questions you don't want to answer and still remain in the study. The investigators may withdraw you from this research if circumstances arise which warrant doing so.

6.IDENTIFICATION OF INVESTIGATORS

In situation where you have any questions or concerns about the research, please feel free to contact the project leader:

Project leader: Nevhutalu T
E-mail: Princessvhu@gmail.com
Contacts: 0795665124

7.RIGHTS OF RESEARCH SUBJECTS

You may withdraw your consent at any time and discontinue participation without penalty. You are not waiving any legal claims, rights, or remedies because of your participation in this research study. If you have questions regarding your rights as a research subject, contact: Mr Abdul Maluleke [Abdul.Maluleke@ul.ac.za]; 015 268 2306 at the University of Limpopo Research office.

SIGNATURE OF RESEARCH SUBJECT OR LEGAL REPRESENTATIVE

The information above was described to me by
(Enumerator) I was given the opportunity to ask questions and these questions were answered to my satisfaction. I hereby consent voluntarily to participate in this study. I have been given a copy of this form.

Name of Subject/Participant

Signature of Subject/Participant

Date:

SIGNATURE OF INVESTIGATOR

I declare that I explained the information given in this document to _____ [*name of the subject/participant*]. He/she was encouraged and given ample time to ask me any questions.

Signature of Investigator : _____ **Date:** _____

APPENDIX B: Household Questionnaire



Faculty of Science and Agriculture

School of Agricultural and Environmental Sciences

Department of Agricultural Economics and Animal Production

AN ANALYSIS OF THE EFFECT OF COVID-19 INDUCED RESTRICTIONS ON RURAL HOUSEHOLDS' FOOD SECURITY: THE CASE OF MAKHADO LOCAL MUNICIPALITY, LIMPOPO PROVINCE

I am a postgraduate student at the university of Limpopo registered for Master of Agricultural Management (Agricultural Economics). I am currently conducting research on the effect of COVID-19 induced restrictions on rural household's food security: a case of Makhado local municipality, Limpopo province. The aim of the study is to analyse how COVID-19 induced restrictions have an effect on rural household food security in Makhado Local Municipality of Limpopo province. Confidentiality and anonymity of the participants will be taken into consideration. The participant's real names will not be mentioned in the study and the information respondents provide will only be used for the research or study purposes.

Contact number: 0795665124/princessvhu@gmail.com

Supervisors' details: Dr LS Gidi (lungile.gidi@ul.ac.za)

: Dr A Mayekiso (mayekisoA@unizulu.ac.za)

Name of enumerator.....

Date of data collection.....

Questionnaire number.....

Section A: Socio-economic characteristics of the respondent

1. Age of the respondent in years?

2. Gender of the respondent?

Male	Female
1	2

3. Educational level of the respondent

No formal education	Primary education	Secondary education	Tertiary education
1	2	3	4

4. Household size (the members of the household who are staying in the house)?

5. Marital status of the household head

Married	Widowed	Divorced	Single
1	2	3	4

6. Do you get any assistance from the government/private services during covid?

Yes	No
1	2

7. If yes, what type of assistance have you received or you are receiving/please state

8. Employment status

Employed	Unemployed
1	2

9. Household income sources: Crop income [] Livestock income []
 Salaries [] Self-employed [] remittance [] Social grants [] other
 [] specify.....

10. Monthly household income R.....

11. Do you have access to credit (bank loans, loan sharks, agricultural loans?)

Yes	No
1	2

12. If yes, what is the amount of credit received per month?.....

13. Were you or are you able to pay the credit offered to you?.....

14. What is the farm size of your farm (ha)?.....

15. are you a member of farmers association?

Yes	No
1	2

SECTION B: The generic Household Food Insecurity Access Scale (HFIAS) questions

Before COVID-19

Questions	Response options	Code before Covid-19
1. Did you worry that your household would not have enough food?	0= No (skip to Q2) 1= Yes	
1(a). How often did this happen?	1= Rarely (once or twice in the past 30 days) 2= Sometimes (three to ten times in the past 30 days) 3= Often (more than 10 times in the past 30 days).	
2. Were you or any household member not able to eat the kinds of foods you preferred because of a lack of resources?	0= No (skip to Q3) 1= Yes	
2(a). How often did this happen?	1= Rarely (once or twice in the past 30 days) 2= Sometimes (three to ten times in the past 30 days) 3= Often (more than 10 times in the past 30 days).	
3. Did you or any household member have to eat limited variety of foods due to lack of resources?	0= No (skip to Q4) 1= Yes	
3(a). How often did this happen?	1= Rarely (once or twice in the past 30 days) 2= Sometimes (three to ten times in the past 30 days) 3= Often (more than 10 times in the past 30 days).	
4. Did you or any other household member eat some foods that you really do not want to eat because of lack of resources to obtain other types of food?	0= No (skip to Q5) 1= Yes	
4(a). How often did this happen?	1= Rarely (once or twice in the past 30 days) 2= Sometimes (three to ten times in the past 30 days)	

	3= Often (more than 10 times in the past 30 days).	
5. Did you or any household member have to eat a smaller meal than you felt you needed because there was not enough food?	0= No (skip to Q6) 1= Yes	
5(a). How often did this happen?	1= Rarely (once or twice in the past 30 days) 2= Sometimes (three to ten times in the past 30 days) 3= Often (more than 10 times in the past 30 days).	
6. Did you or any household member have to eat fewer meals in a day because there was not enough food?	0= No (skip to Q7) 1= Yes	
6(a). How often did this happen?	1= Rarely (once or twice in the past 30 days) 2= Sometimes (three to ten times in the past 30 days) 3= Often (more than 10 times in the past 30 days).	
7. Was there ever no food at all in your household because there were not resources to get more food?	0= No (skip to Q8) 1= Yes	
7(a). How often did this happen?	1= Rarely (once or twice in the past 30 days) 2= Sometimes (three to ten times in the past 30 days) 3= Often (more than 10 times in the past 30 days).	
8. Did you or any household member go to sleep at night hungry because there was not enough food?	0= No (skip to Q9) 1= Yes	
8(a). How often did this happen?	1= Rarely (once or twice in the past 30 days) 2= Sometimes (three to ten times in the past 30 days) 3= Often (more than 10 times in the past 30 days).	
9. Did you or any household member go a whole day without eating anything because there was not enough food?	0= No (questionnaire is finished) 1= Yes	
9(a). How often did this happen?	1= Rarely (once or twice in the past 30 days)	

	2= Sometimes (three to ten times in the past 30 days) 3= Often (more than 10 times in the past 30 days).	
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During COVID-19

Questions	Response options	Code
1. Did you worry that your household would not have enough food?	0= No (skip to Q2) 1= Yes	
1(a). How often did this happen?	1= Rarely (once or twice in the past 30 days) 2= Sometimes (three to ten times in the past 30 days) 3= Often (more than 10 times in the past 30 days).	
2. Were you or any household member not able to eat the kinds of foods you preferred because of a lack of resources?	0= No (skip to Q3) 1= Yes	
2(a). How often did this happen?	1= Rarely (once or twice in the past 30 days) 2= Sometimes (three to ten times in the past 30 days) 3= Often (more than 10 times in the past 30 days).	
3. Did you or any household member have to eat limited variety of foods due to lack of resources?	0= No (skip to Q4) 1= Yes	
3(a). How often did this happen?	1= Rarely (once or twice in the past 30 days) 2= Sometimes (three to ten times in the past 30 days) 3= Often (more than 10 times in the past 30 days).	
4. Did you or any other household member eat some foods that you really do not want to eat because of lack of resources to obtain other types of food?	0= No (skip to Q5) 1= Yes	
4(a). How often did this happen?	1= Rarely (once or twice in the past 30 days) 2= Sometimes (three to ten times in the past 30 days)	

	3= Often (more than 10 times in the past 30 days).	
5. Did you or any household member have to eat a smaller meal than you felt you needed because there was not enough food?	0= No (skip to Q6) 1= Yes	
5(a). How often did this happen?	1= Rarely (once or twice in the past 30 days) 2= Sometimes (three to ten times in the past 30 days) 3= Often (more than 10 times in the past 30 days).	
6. Did you or any household member have to eat fewer meals in a day because there was not enough food?	0= No (skip to Q7) 1= Yes	
6(a). How often did this happen?	1= Rarely (once or twice in the past 30 days) 2= Sometimes (three to ten times in the past 30 days) 3= Often (more than 10 times in the past 30 days).	
7. Was there ever no food at all in your household because there were not resources to get more food?	0= No (skip to Q8) 1= Yes	
7(a). How often did this happen?	1= Rarely (once or twice in the past 30 days) 2= Sometimes (three to ten times in the past 30 days) 3= Often (more than 10 times in the past 30 days).	
8. Did you or any household member go to sleep at night hungry because there was not enough food?	0= No (skip to Q9) 1= Yes	
8(a). How often did this happen?	1= Rarely (once or twice in the past 30 days) 2= Sometimes (three to ten times in the past 30 days) 3= Often (more than 10 times in the past 30 days).	
9. Did you or any household member go a whole day without eating anything because there was not enough food?	0= No (questionnaire is finished) 1= Yes	
9(a). How often did this happen?	1= Rarely (once or twice in the past 30 days)	

	2= Sometimes (three to ten times in the past 30 days) 3= Often (more than 10 times in the past 30 days).	
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Table 2: The Household Dietary Diversity Score (HDDS) generic questions Before COVID-19

Questions	Coding categories (Yes = 1, No = 0)
13. Any bread, rice noodles, biscuits, or any other foods made from millet, sorghum, maize, rice, wheat?	
14. Any potatoes, yams, manioc, cassava or any other foods made from roots or tubers?	
15. Any vegetables?	
16. Any fruits?	
17. Any beef, pork, lamb, goat, rabbit wild game, chicken, duck, or other birds, liver, kidney, heart, or other organ meats?	
18. Any eggs?	
19. Any fresh or dried fish or shellfish?	
20. Any foods made from beans, peas, lentils, or nuts?	
21. Any cheese, yogurt, milk or other milk products?	
22. Any foods made with oil, fat, or butter?	
23. Any sugar or honey	
24. Any other foods, such as condiments, coffee, tea?	

During COVID-19

Questions	Coding categories (Yes = 1, No = 0)
1. Any bread, rice noodles, biscuits, or any other foods made from	

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

SECTION C: Coping Strategies available for the households

What do you do when you do not have enough food and do not have enough money to buy food?
1. Dietary Change
a. Rely on less preferred and less expensive foods
2. Increase Short-Term Household Food Availability
b. Eat the same meal everyday
c. Purchase food on credit
d. Gather wild food, hunt, or harvest immature crops
e. Consume seed stock kept for next production season
3. Rationing strategies
a. Limit portion size at mealtimes
b. Restrict consumption by adults for small children to eat
c. Reduce number of meals eaten in a day

Consumption coping strategies patterns

Behaviours: In the past 7 days, if there have been times when you did not have enough food or money to buy food, how many days has your household had to:	Frequency: Number of days out of past seven: (Use numbers 0-7 to answer number of days; Use NA for not applicable)
a. Rely on less preferred and less expensive foods?	
b. Borrow food from a friend or relative?	
c. Purchase food on credit?	
d. Gather wild food, hunt, or harvest immature crops?	
e. Consume seed stock held for next season?	
f. Limit portion size at mealtimes?	

g. Restrict consumption by adults for small children to eat?	
h. Reduce number of meals eaten in a day?	

Your participation in this study is highly appreciated!



APPENDIX C: Ethical Clearance University of Limpopo

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Private Bag X1106, Sovenga, 0727, South Africa

Tel: (015) 268 3935, Fax: (015) 268 2306, Email:

anastasia.ngobe@ul.ac.za

TURFLOOP RESEARCH ETHICS COMMITTEE ETHICS CLEARANCE CERTIFICATE

MEETING: 23 May 2022

PROJECT NUMBER:

TREC/101/

2 022: PG PROJECT:

Title: Analysing the Effect of COVID 19 Induced Restrictions on Rural Household's Food Security: A Case of Makhado Local Municipality, Limpopo Province

Researcher: T Nevhutalu


Supervisor: Dr LS Gidi

Co-Supervisor/s: Dr A Mayekiso

Note:

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

Degree: Master of Agricultural Management (Agricultural Economics)



PROF D MAPOSA

CHAIRPERSON: TURFLOOP RESEARCH ETHICS COMMITTEE

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

APPENDIX D: Editorial Certificate

UNIVERSITY OF LIMPOPO

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



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14 November 2022

TO WHOM IT MAY CONCERN

This letter serves to certify that I have edited a research dissertation titled: **ANALYSING THE EFFECT OF COVID-19 INDUCED RESTRICTIONS ON RURAL HOUSEHOLD'S FOOD SECURITY: A CASE OF MAKHADO LOCAL MUNICIPALITY, LIMPOPO**

PROVINCE by **NEVHUTALU THIVHULAWI**. I am an Associate Member of the Professional Editors' Guild in South Africa.

I trust you will find the editing quality in order. Best regards

Sebola, M

DR. MOFFAT SEBOLA