

UNIVERSITY OF KWAZULU-NATAL

**HOUSEHOLD VULNERABILITY TO FOOD INSECURITY DURING THE
COVID-19 PANDEMIC: A CASE OF RURAL SOUTH AFRICA**

Nonhlanhla Violet Hlope

222049005

A dissertation submitted in partial fulfilment of requirements for the degree

of

Master of Commerce in Economics

School of Accounting, Economics and Finance

College of Law and Management Studies

Supervisor: Professor Gerry Bokana

2023

Supervisor's authorisation for submission for examination

Student name: Nonhlanhla Violet Hlope

Student number: 222049005

As the candidate's supervisor, I authorise the submission of this dissertation for examination.

In addition, I have looked through the Turn-it-in report of the final draft and am satisfied that any matches between the student's work and that of others are either incidental or result from the use of common words and phrases.

Supervisor's name: Professor Koye Gerry Bokana

Date: 27th June 2023

DECLARATION

I, Nonhlanhla Violet Hlope, declare that:

- (i) The research reported in this dissertation, except where otherwise indicated, is my original research.
- (ii) This dissertation has not been submitted for any degree or examination at any other university.
- (iii) This dissertation does not contain other persons' data, pictures, graphs or other information, unless specifically acknowledged as sourced from other persons.
- (iv) This dissertation does not contain other persons' writing, unless specifically acknowledged as sourced from other researchers. Where other written sources have been quoted, then:
 - a) their words have been re-written, but the general information attributed to them has been referenced:
 - b) where their exact words have been used, their writing has been placed inside quotation marks and referenced.
- (v) This dissertation does not contain text, graphics or tables copied and pasted from the Internet, unless specifically acknowledged, and the source detailed in the dissertation and in the final References section.

Signature: 

Date: 27th June 2023

ACKNOWLEDGEMENTS

I dedicate this work to the Lord Almighty, the Alpha and Omega through Christ Jesus. Your love and grace carried me through, and you provided me with all the skills to conquer all the obstacles I came across. It is only because of you that I am alive, and I dedicate my life to serving your will, knowing that all your promises come to fruition.

To my maternal family, I am blessed to have you. You raised me with respect and discipline. You always showed me that my late paternal grandmother took me under her wing and helped you to raise me despite all odds, ensuring that I always see the good in all people, no matter the situation. May the good Lord shower you with all that is good.

A special thank you to my grandmother, mother and aunt, for encouraging me to continue with my studies even though I was pregnant. Your support and teamwork sustained my confidence when it seemed my world would close on me. Your spirit of ensuring that I achieve my academic goals made me even stronger. This unity has shown me that we achieve more together.

To my general practitioner, Dr Tinyiko Chauke, thank you for showing me the importance of not giving up on my dreams because of pregnancy. My partner, Tsakane Gomba, you made sure that my work and academic life were balanced. Your patience and tolerance helped me to maintain my calm and peace of mind. My work colleagues, Martha Mogale, Nthathuo Monokoane, Tolu Oluwaranti, Busisiwe Mabaso and Jeffrey Sithole, I am grateful for your help. May God reward you for your efforts and give you the courage to provide aid to others in need.

Thabo Hlope, my little brother, you eased my load-shedding stress and sharing our academic experience made the journey enjoyable. Another special thank you to my three friends, Lukhanyo Mtshingana for recommending the University of Kwa-Zulu Natal, Tidimalo Maphoto for assisting me when I needed academic and personal help, and Michel Hakizimana for becoming my study partner and ensuring that I met all deadlines.

Professor Gerry Bokana, you are a very patient supervisor who guided me throughout this research. You supported and gave me counsel every step of the way. Through your support, my research skills improved, and I acquired various critical skills. You have not only been a supervisor but a role model of wisdom, knowledge and character. For this reason, I hope to make you proud.

Finally, I want to express my appreciation to the School of Accounting, Economics and Finance for giving me the chance to join this esteemed institution. Thank you for your supportive assistance. Special thanks to Dr. Vermaak and her team.

Nonhlanhla Violet Hlope

ACRONYMS

Covid-19:	Corona-Virus disease
CS:	Community Survey
EAs:	Enumeration Areas
FAO:	Food and Agricultural Organisation
GHS:	General Household Survey
NDP:	National Development Plan
NGOs:	Non-Governmental Organisations
SDG:	Sustainable Development Goal
SFPs:	School Feeding Programmes
SLF:	Sustainable Livelihood Framework
StatsSA:	Statistics South Africa
UIF:	Unemployment Insurance Fund
VEP:	Vulnerability as Expected
WFP:	World Food Programme

ABSTRACT

The COVID-19 pandemic has been one of the most challenging health crises of the 21st century. Not only did it affect the health condition of individuals, but it also affected the economy, leaving governments devastated and households destitute. While trying to lower the transmission of the virus, various restrictions were imposed, and this led to a food security crisis. In order to determine home susceptibility to household food insecurity during the COVID-19 pandemic, this study employed a logit econometric technique.

The four pillars established by the Food and Agricultural Organisation (FAO) were utilized to comprehend the nature of food availability, accessibility, utility, and stability in order to deepen our grasp of food security. The study focused on food availability and accessibility for households. The study utilised the theoretical approach Sustainable Livelihood Framework (SLF), capital endowments. These are resources used by households to remain food resilient. Food insecurity was one of the consequences of COVID-19, specifically its impact on household capital endowments and livelihood strategies.

Utilizing cross-sectional panel data from the Department of Statistics South Africa, this study used a quantitative methodology (StatsSA). The General Household Survey (GHS) 2020 from StatsSA was conducted across the country's nine provinces. Using descriptive analysis to show the trends in food security, as well as the logit model, the study used a binary dependent variable with five asset classes of the capital endowments and vulnerabilities affecting households as empirical evidence of food insecurity in rural areas in South Africa.

With the challenges brought about by the pandemic, rural households had to adjust to new methods of living. The results show that the households' possession of the asset classes played a significant role in their ability to secure food during the Covid-19 pandemic. For example, households that were led by educated and economically active members were able to secure food during the pandemic compared to those that were not. A home that acquired its own income without relying on remittances was able to obtain food even during times when movement was restricted. Food security depended on the head of the home. Male-headed households were more likely to have access to food than female-headed households.

Contents

DECLARATION.....	iii
ACKNOWLEDGEMENTS	iv
ACRONYMS.....	vi
ABSTRACT.....	vii
LIST OF TABLES	xii
CHAPTER 1	1
Introduction.....	1
1.1. Background to the study	1
1.2. Types of food Insecurity	5
1.3. Food Security and Covid-19	6
1.4. The effects of Covid-19 on components of food security	10
1.4.1. Impact on food availability.....	10
1.4.2. Impact on food access	10
1.4.3. Impacts on food utility.....	11
1.5. The impact of social grants on food security	11
1.6. Food security from an economic point of view	12
1.7. Statement of the problem	13
1.8. Justification for the study.....	13
1.9. Objectives and research questions of the study.....	14
1.10. Scope of the study.....	14
1.11. Structure of the study	15
1.12. Summary	15
LITERATURE REVIEW	17
2.1. Introduction	17
2.2. Sustainable Livelihood Framework.....	17
2.2.1. Human capital	17
2.2.2. Physical capital.....	18
2.2.3. Financial capital	18
2.2.4. Social capital.....	18
2.2.5. Natural capital.....	19
2.3. Empirical Review	19

2.3.1. Evidence from Nationally Representative Survey Data	19
2.3.2. Evidence from the 2008 global food crisis.....	20
2.3.3. Evidence from Ethiopia	21
2.3.5. The state of food security in South Africa	22
2.4. Conclusion.....	25
CHAPTER 3	26
METHODOLOGY AND DATA COLLECTION.....	26
3.1. Introduction	26
3.2. Type of study	26
3.4. Methodology	27
3.5. Conclusion.....	29
CHAPTER 4.....	30
EMPIRICAL RESULTS, ANALYSIS AND DISCUSSION.....	30
4.1. Introduction	30
4.2. Results and analysis	30
4.3. Marginal effect results	38
4.4. Conclusion.....	41
CHAPTER 5.....	43
CONCLUSIONS AND POLICY IMPLICATIONS.....	43
5.1. Conclusion.....	43
5.2. Policy implications.....	44
5.2.1. Better access to education.....	44
5.2.2. Land conversion, access to land and water.....	44
5.2.3. Preserving traditional knowledge for skills development	45
5.2.4. Economic activity	45
5.2.5. Improving communication and access to information.....	45
5.2.6. Creating food and seed banks	45
5.2.7. Market supply	46
The longterm repercussions of COVID 19 on food insecurity and inequality.....	49
The effects of load-shedding on household food security	46
5.3. Limitations of the study	46
5.4. Recommendations	47
References	48

APPENDICES	57
Appendix A: Stata Output tables	57
Appendix C: Editor’s Letter	85
Appendix D: Turnitin report	86

List of figures

Figure 1: Signs of insufficient food access at the home level.....	2
Figure 2: An overview of food security.....	4
Figure 3: Food insecurity and hunger by location in South Africa.....	7
Figure 4: Respondents who received support for food or accommodation during the pandemic.....	8
Figure 5: Percentage of households experiencing food adequacy or inadequacy by province, 2019.....	23
Figure 6: Provincial household food adequacy distribution.....	24

LIST OF TABLES

Table 1: Experience of Household Food Insecurity by Quintiles of Consumption in Ethiopia	9
Table 2: Types and percentages of aid provided to households since the COVID-19 outbreak in SA.	9
Table 3: Levels of adequacy in accessing food by sex of the head of the household	24
Table 4: Descriptive Statistics and Expected Signs	30
Table 5: Food security Logit model	34
Table 6: Food security measured by head of the household’s level of education.	38
Table 7: Food security measured by household Covid-19 status.	39
Table 8: Food security measured by means of the social relief of distress grant	40
Table 9: Food security for households’ agricultural goods	40

CHAPTER 1

Introduction

1.1. Background

Food security has been defined in diverse ways by different researchers and interested organisations. The Food and Agricultural Organisation (FAO) World Food Summit, which took place in Rome in 1996, provides the most befitting definition, stating that "food security occurs when all people, at all times, have physical, social, and economic access to sufficient, safe, and nutritious food to meet their dietary needs and food preferences for an active and healthy life" (FAO, 2006). According to this definition, policymakers can evaluate food security using the four aspects of availability, accessibility, utilization, and stability (Patrick, Khalema, Abiolu, Ijatuyi & Abiolu 2021).

Food is available when it can be obtained by people and households for consumption to meet their daily needs. Physical food stocks are the key concern regarding food availability (Tibesigwa, Visser, Collinson and Twine, 2016). This is a reference to the provision of food, as evidenced by the degree of food production and conserved stocks (FAO, 2017). Sustainable production methods, well-managed resources, and productivity-boosting regulations are necessary to increase food availability (Karyn and Salman, 2011).

The accessibility of food refers to the bundle of entitlements related to purchasing products. Access relates to how easily and affordably households may buy and receive enough wholesome food to meet their nutritional needs (Kaplan and Norton, 2006). Security of food entails access due to the availability of food preferences for a well-balanced life. Access to food differentiates individuals within the community by focusing on the gaps that exist in resource endowments amongst and within households (Tibesigwe et al., 2016). Access then is enhanced by different livelihood coping strategies to mitigate against food vulnerability in various communities. Even though households utilize a variety of strategies to buy food, household access to food is complicated. In rural areas, the ability of households accessing food means owning the land on which food is produced or having a stable income to secure such food (Sakyi, 2012). According to Schönfeldt (2003), access to food can be divided into four categories, namely:

Physical access - which is the availability of infrastructure for food distribution, such as markets and roads.

Economic access - this relates to the household's capacity to purchase food or grow its own food in order to meet its needs.

Social access - this is when the society can accept the food culturally; and

Technological access - this refers to households' ownership of technological facilities for food preparation or preservation.

Webb et al. (2006) note that there are no specific methods to measure food access, hence most studies focus on the various behaviours that depict hunger experiences and the severity of food stress. Current studies on food security confirm that there are food insecurity conditions that can be measured in different countries and cultures to show food accessibility since income and food expenditure household data collection is expensive and time-consuming (Kirkland et al. 2013). According to Coates et al. (2006), there are three key causes of food insecurity: inadequate food quality which is the lack of nutrition in the food that households consume; inadequate food quantity which speaks to the supply of food in the household; and uncertainty and stress about food. These three aspects are elaborated in the inadequate household food access figure below.

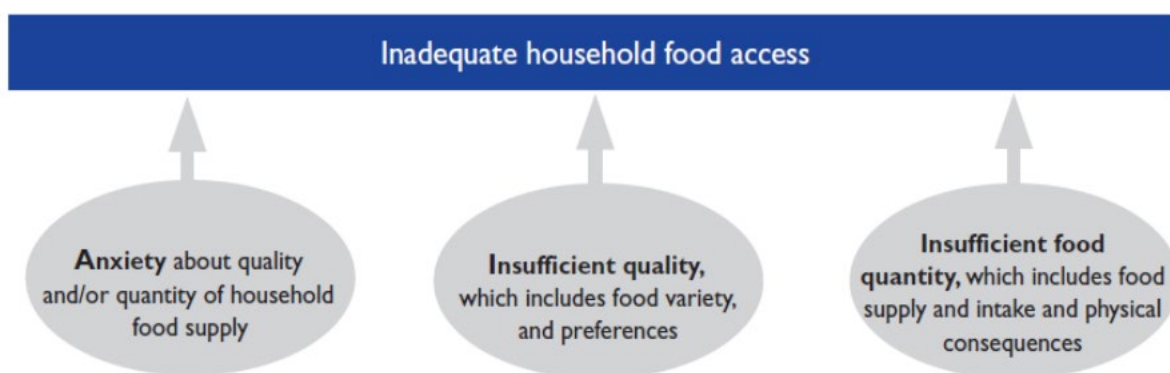


Figure 1: Signs of insufficient food access at the home level

Source: Deitchler, Ballard, Swindale, and Coates (2011)

Utilisation of food is connected to concerns about the good use of food that individuals and households' access. Food security is influenced by the nutritional content of food, which is determined by examining its micronutrients and vitamins as well as the body's capacity to metabolise and absorb these nutrients (Barret, 2010). The utilisation of food is concerned with dietary and nutritional quality which may include food storage, processing, health and sanitation as they relate to nutrition (Capaldo et al., 2010). According to Food and Nutrition Technical Assistance (FANTA) and Food Aid Management (2003), food security problems arise as a result of inadequate food availability, inadequate access to food or poor food utilisation.

Food stability is the availability of food to provide to people when they need it (Kirkland, Kemp, Hunter & Twine, 2013). This involves purchasing and storing food for the consumers to develop effective support for their households. Food stability is a coping strategy used by different organisations to ensure that communities can meet their needs (Striteska and Spickova 2012). Stability gives rise to food pooling, which refers to the grouping together of food for purposes of maximizing advantages for institutions as well as minimising the risks for the communities. It also aims to help households to access food, which they would not have been able to do previously if the government was unable to manage food pooling (Kaplan and Norton, 2006). The schematic map below represents an overview of food security.

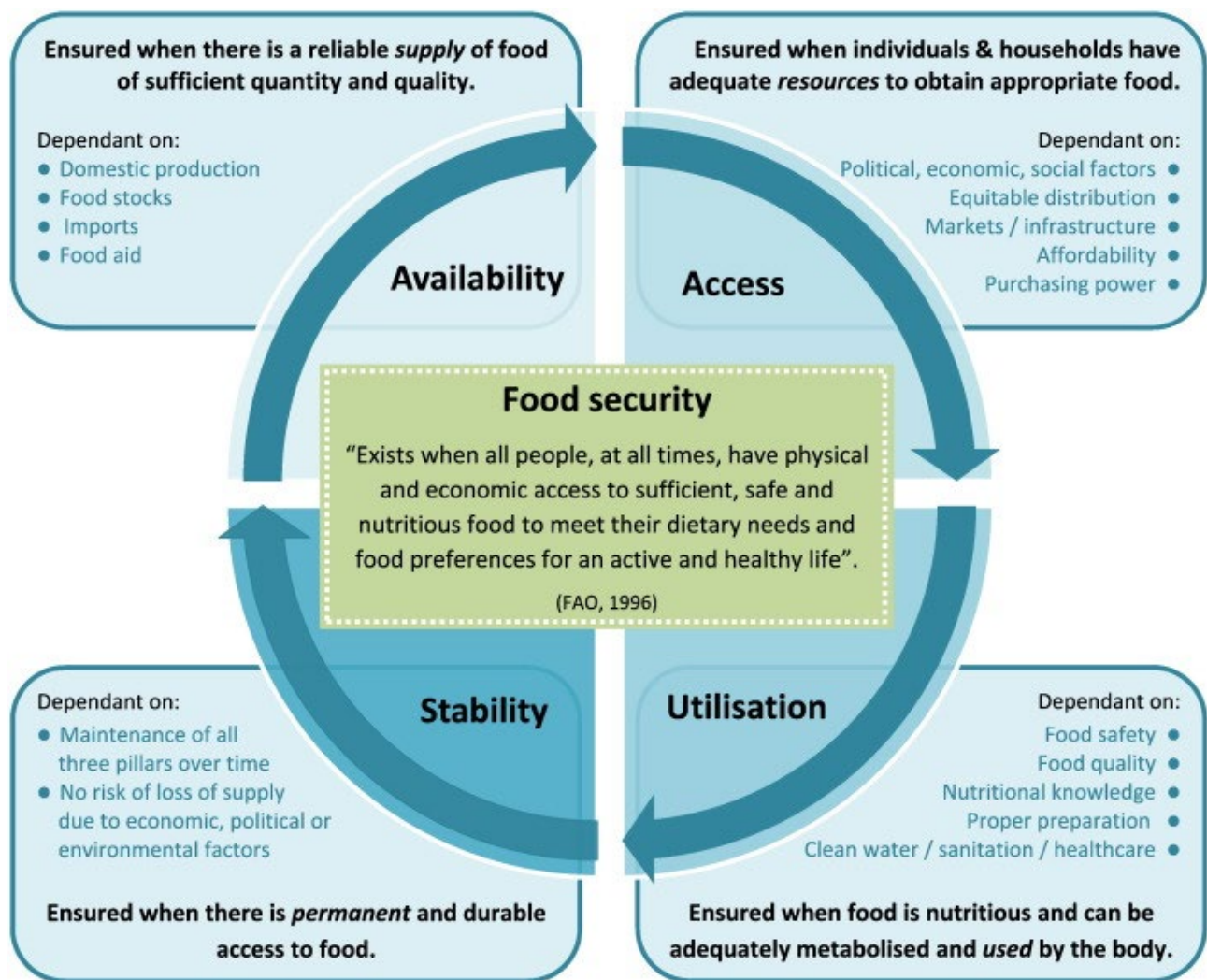


Figure 2: An overview of food security

Source: Wagle, K. (2018)

These four pillars of food security should always remain stable for a household to be food secure. However, between 2020 and 2021, the rise in the number of COVID-19 cases in South Africa led to a disruption of activities related to food security. The South African government imposed several rules and regulations to reduce the number of infections linked to the COVID 19 virus. This decision to impose restrictions led to the introduction of curfew times, lockdown protocols, and social distancing measures designed to save lives, but at the cost of households being able to secure food. Scholars discovered at least four processes that link food insecurity to COVID-19 (Amare et al. 2021). The first mechanism is the fear of catching the virus, which reduces conducting activities that are income-generating. This has an impact on both domestic and

international income streams, including remittances. For instance, the initial effect of the pandemic was a decrease in remittances, which are essential for ensuring food security during times of crises (Obi et al., 2020; Breisinger et al. 2020; Diao and Mahrt, 2020). Secondly, the virus's control measures, such as mobility restrictions and lockdowns, hurt livelihood activities (Abay et al. 2020b; Arndt et al., 2020; World Bank, 2020). Thirdly, the disruption of supply lines for food and other goods limited access to food (Aggarwal et al. 2020; Hirvonen et al. 2021b; Mahajan and Tomar, 2021). Finally, notwithstanding poor food affordability, disruptions in food systems and value chains drove up food prices (von Braun et al., 2014; Devereux et al., 2020).

1.2. Types of food insecurity

According to Fawole, et al. (2015:6), "people experience food insecurity when they do not have sufficient physical or financial access to sufficient amounts of safe, nourishing, and socially acceptable food for a healthy and productive life." Food insecurity, according to Devereux (2006), can be split into three kinds, namely chronic, transitory and seasonal food insecurity. South Africa experiences all three of them (Adeniyi, 2021). Chronic food insecurity is when there is persistent long-term unavailability of sufficient food (Hart, et al. 2022). This results in a state of perennial food insecurity for households. Households that find themselves in this situation are incapable of accessing and satisfying each member's needs for food, thus hunger is common in these households (Hart et al. 2022). Since the beginning of the COVID 19 pandemic, 18% of South African households were reported to experience chronic food insecurity (StatsSA, 2020).

Food insecurity occurs when there is no food available for a period of time due to various factors, such as natural disasters that result in crop failure that exert an impact on the production of food, increasing food insecurity; conflicts that reduce food availability by causing instability in the markets; including food supply and commodity speculation that results in inflation while purchasing power decreases, (Van Wyk and Dlamini, 2018). Prior to the COVID-19 pandemic, there was acute temporary food insecurity in South Africa during the global economic crisis, and it never recovered to its pre-crisis proportions (Hart et al. 2022). In addition, continued transitory food insecurity occurrences may increase household vulnerability to chronic food insecurity (Devereux, 2006). This implies that food systems' resilience to shocks is still far from recovery since it took the country two years to stabilize from the 2007 crisis (StatsSA, 2019). Seasonal labour demand fluctuations and regular patterns of local output harvest seasons can be used to

characterise seasonal food insecurity. In South Africa, this mainly affects the agricultural sector's value-chain (Hart et al. 2022).

1.3. Food security and COVID-19

The COVID-19 pandemic had a number of effects on household food security. Scholars identified at least four processes that link food security to COVID-19 (Amare et al. 2021). The first mechanism is the fear of catching the virus, which reduces the ability to engage in income-generating activities. This has an impact on both domestic and international income streams, including remittances. For instance, the pandemic may reduce remittances, which are crucial for guaranteeing food security in times of crises (Obi et al. 2020). Secondly, restrictions on movement and lockdowns enforced by the government to combat the virus have had an influence on livelihood activities (Abay et al. 2020b; Arndt et al. 2020; World Bank, 2020). Thirdly, the interruption of food supply and chain limits access to food (Aggarwal et al. 2020; Hirvonen et al. 2021b; Mahajan and Tomar, 2021). Finally, despite low food affordability, disruptions in food systems and value chains drive up food prices (von Braun et al. 2014; Devereux et al. 2020).

In South Africa, threats to food insecurity during the pandemic were more pronounced and adverse in rural households than in urban households (van der Berga et al., 2022). Research suggests that 38% of these homes ran out of money to buy food and 19% of the homes experienced actual hunger during this period compared to their urban counterparts as shown in Figure 3 below.

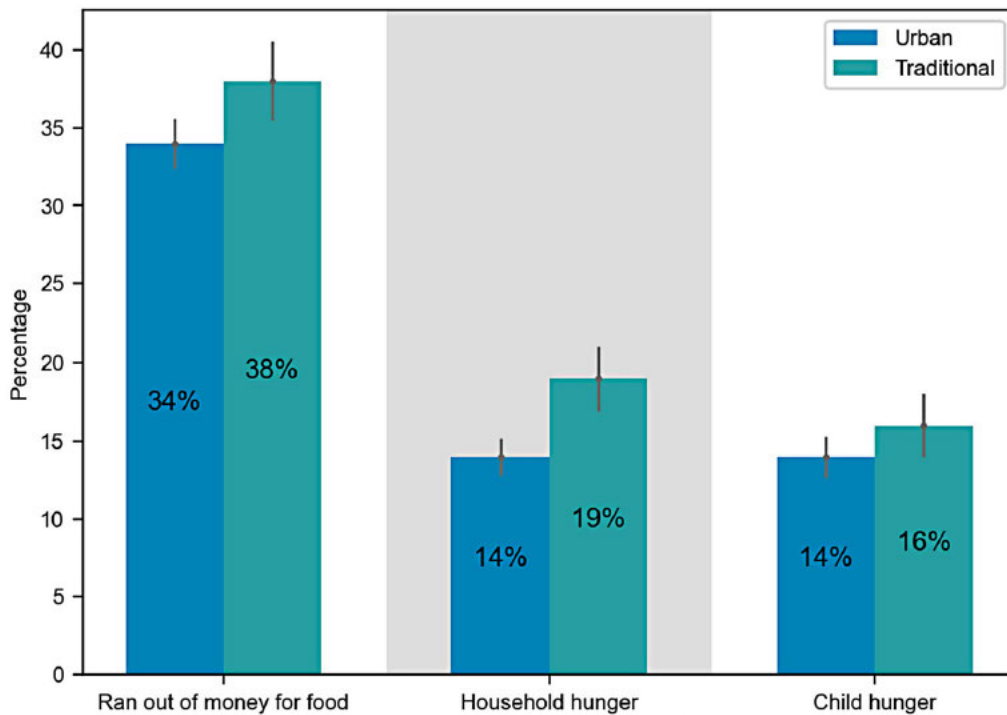


Figure 3: Food insecurity and hunger by location in South Africa during COVID 19

Source: van der Berga et.al., 2022

At the early stages of the pandemic, various groups and government offered diverse forms of support to mitigate food insecurity in South African households. The support given ranged from provision of food relief to accommodation rendered through government, non-governmental organisations (NGOs), faith-based organisations, the private sector, philanthropic initiatives and informal channels of social provision (Wills et al., 2020). Figure 4 below shows the numbers of respondents who received support from various groups during the pandemic in South Africa.

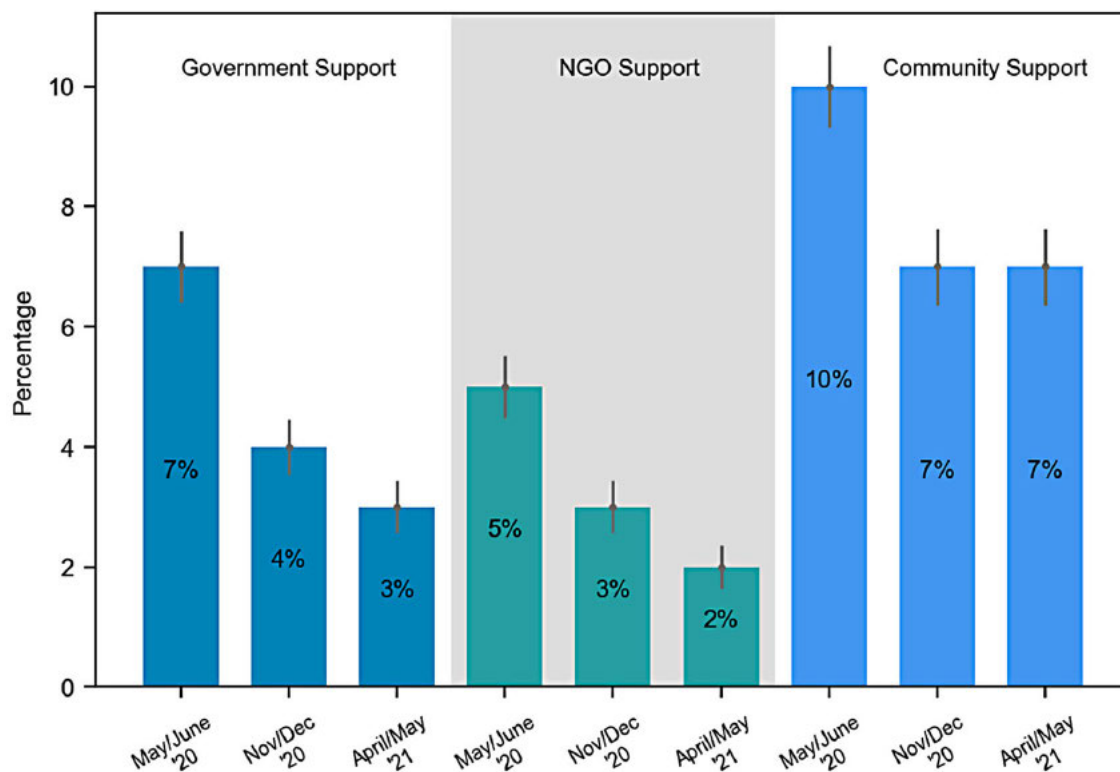


Figure 4: Respondents who received support for food or accommodation during the pandemic

Source: van der Berga et.al.,2022

Also, in Ethiopia, for instance, between mid-March and April of 2020, approximately 23% of homes ran out of food, 21% of people went without food for part of the day, and 14% of adults went without food the entire day (Wieser et al,2020). This study was conducted in collaboration with the World Bank Group. Both rural and urban settlements experienced this paucity in food supply and access. Households in the top distribution segment, however, were not significantly impacted during the lockdown times. A complete day without food was experienced by 20% of the poorest 20% of households, compared to only 7% of the wealthiest 20% in Ethiopia, as shown in Table 1 below.

Table 1: Experience of Household Food Insecurity by Quintiles of Consumption in Ethiopia

	Q1: Poorest	Q2: Poorer	Q3: Middle	Q4: Richer	Q5: Richest
Food ran out in the household	29.8	28.3	25.8	16.7	15.0
Adult was hungry yet unfed	24.3	25.2	23.7	17.3	14.9
Adults spent the entire day without eating	19.6	16.6	15.3	9.1	7.4

Source: Wieser et al. (2020)

Rural households needed help from the government, non-governmental organisations (NGOs), or religious institutions to survive the epidemic, with more than half of the households reporting a decrease in income (Wieser et al. 2020). The assistance came in various forms such as food parcels and direct cash transfers. Approximately 80% of the help was provided through rural and urban productive safety-net programmes, with the government as the major provider. The support source and type of aid received based on the assistance households received are shown in Table 2 below.

Table 2: Types and percentages of aid provided to households since the COVID-19 outbreak.

	Rural	Urban	National
Any source provided support to the household.	10.0	3.1	7.8
Free food as a sort of assistance.	44.1	67.7	47.2
Food assistance or payment for services.	16.9	7.9	15.7
Direct cash transfer is the sort of assistance.	39.4	33.5	38.6

Government is the source of the aid.	76.0	82.6	76.9
Source of assistance: NGO	13.6	0.2	11.8
Source of assistance: a religious organization.	4.2	4.1	4.2
Source of assistance: a volunteer or youth organization.	6.1	12.4	7.0

Source: Wieser et al. (2020)

Table 2 shows that households survived only through the free food and direct cash transfers. The lockdown regulations that were imposed by the government meant that people could not move around.

1.4. The effects of Covid-19 on food security

1.4.1. Impact on food availability

The food supply was negatively impacted by restrictions enforced during Covid-19. This was evident in the formal and informal markets as there were radical changes in stock availability as all food generally became scarce and expensive (Venning, 2021). Without readily available seeds, for instance, it became difficult for households to grow their own food for consumption, which ultimately affected food security. This also affected households that relied on the sales of homegrown food for income because they were unable to supply the local market as the opportunity cost of these supplies rose because of the Covid-19 regulations (Venning, 2021). The reduced availability of food supplied, particularly into the informal markets that most rural households depend on, exposed many households to extreme vulnerability and severe food insecurities (StatsSA, 2017).

1.4.2. Impact on food access

Food accessibility can be viewed from an economic or physical perspective. On the physical aspect of accessing food, the limit to movement due to the curfews imposed changed the patterns of market access. For instance, if household members used to visit the markets three times a week, this was reduced to only a day or two unless they were essential workers or travellers as there was no change in the number of days markets would be accessed (Venning, 2021). The costs of

transportation also increased which enlarged the obstacles to market access. The wearing of masks was another reason for decreased patterns of accessing the market as most people found it hard to breathe with the masks on (Venning, 2021). People's misperceptions about contracting the virus added to the change in behaviour. There were households that depended on school feeding programmes (SFPs) for their meals, and when schools closed due to Covid-19, SFPs were suspended, leaving such households without food (Venning, 2021).

As a food stressor, Covid-19 added towards the increased unemployment rate in South Africa, influencing local economic resources significantly. While most people were still seeking opportunities before the pandemic, many people were either replaced or denied opportunities due to downsizing by employer institutions and organisations (Venning, 2021). In his paper, Venning (2021) contends that it was easier to get seasonal jobs on farms but due to Covid-19, farmers also became selective as to who they could employ and thus household income was dramatically reduced. Economic access to food was not easy as days or even weeks passed by without one having found a job. In some instances, those who remained in their jobs had their work hours and income reduced, while the prices of food kept rising.

1.4.3. Impacts on food utility

Changes in food accessibility and availability due to Covid-19 influenced changes in how households use their food. Venning (2021) notes that households' diets changed in such a way that food varieties were decreased. This also meant that the nutritional value of the food available changed. Some households eat the same food daily, for example, they serve pap and spinach every night. The cooking pot sizes were reduced to save what they had, while other households skipped meals (Venning, 2021).

1.5. The impact of social grants on food security

Cash transfers enhance food accessibility and consumption, according to numerous studies (Waidler and Devereux, 2019). This transaction reduces food insecurity in communities. In a study by Hoddinott and Weismann (2010), households in Mexico and Nicaragua showed an increase in their availability per capita caloric, quality diet, and diversity of food when accessing cash transfers. In their two years of observation, the Productive Safety Net Programme in Ethiopia established that households that received cash and food transfers as unconditional direct help had better food security (Waidler and Devereux, 2019). For households receiving larger transfers, the

effect was greater (Berhane et al., 2011). Over the course of a year, the Mchinji Social Cash Transfer Scheme in Malawi showed a reduction in the percentage of children with stunted growth from 55% to 46% (Aliyu, 2021). In Zambia, it was noted that households that received cash transfers from the Child Grant Programme had increased food spending, consumption and dietary diversification (Waidler and Devereux, 2019). However, children whose mothers had access to clean water and were educated had a significant decline in stunting (Seindenfeld et al., 2014). Almost every programme reports positive development in consumption and diversity of food. According to Manley et al. (2012), there are no nutritional status effects, implying that improved access to food does not mean improved nutritional status. A study by Bastagli et al. (2016) found a significant reduction in child stunting, wasting and underweight, implying that the long-term effects of nutritional deficits can be reduced.

In South Africa the government's grant welfare system was disrupted by the limits put in place to stop Covid-19 from spreading, which made it more difficult for people to obtain their grants (Venning, 2021). This is because while money was distributed to homes in three different groups on the first of each month, this was no longer the case, nor was it feasible under the confinement. Old age funds come in first, then disability grants, child support grants, and all other grants. Some households go without any foodstuff while waiting to receive this money. This means that they are unable to access food during the time when they are still waiting for their day. Hart, et al. (2022) note that, rural areas are normally far from towns, where members only rely on grants alone, they make only one trip, meaning that they must go to town once every member's grant date is effective.

1.6. Food security from an economic point of view

The Covid-19 pandemic is one of the world's economic recessions that could take years for economies to recover from (Aliyu, 2021). With all the years taken to justify policies that increased the growth of outputs and allocation of resources to enhance the availability of food for local consumption, this means that economies need more years to return to the same production stages of pre-Covid-19 (Aliyu, 2021). The four components of food security as set out by FAO offer a framework to fully examine food security by assessing the demand-side effects of labour, household production and trade (Vanlauwe, et al. 2010). The results of these four components are a spill over of knowledge and income generation for households to attain food security over the long-run period.

1.7. Statement of the research problem

The devastating effects of COVID-19 increased many households' vulnerabilities to food security globally and in South Africa (Arndt et al., 2020). Its impact overwhelmed human, health, livelihoods and food security, aggravating the already daunting and worrisome situation of the country's vulnerability to household food insecurity (Ishiwatari, 2020). WHO and FAO (2020) assert that since the outbreak of the virus, issues relating to food security concerns have increased. This is not only shown by an increase in the food prices but also the events of panic buying during the early stages of the pandemic outbreak in South Africa (Torero, 2020). Given this, the national and household food security measures had a massive knock-on effect, particularly on the rural poor. Because of the pandemic's impact and the measures implemented to improve food access and affordability, the number of people living in poverty and experiencing food insecurity has increased (Patrick et al., 2021).

It is crucial for South African officials to understand how vulnerable a typical rural South African is to COVID-19 and food insecurity. As it is a constitutional right for people and households to be food secure, this study assists policymakers in (i) adopting measures that can prevent food insecurity when households experience shocks and (ii) identifying vulnerabilities to food insecurity faced by rural households in South Africa. Everyone has the legal right to enough food and water, according to Section 27(1)(b) of the Constitution. Section 27(b) of the same section adds that "the State shall formulate reasonable legislative efforts and take other measures, within its available resources, to achieve the progressive realisation of these rights." In order to create coping strategies for rural households vulnerable to food insecurity, the empirical findings from the study are a benchmark for the National Development Plan 2030 and the Sustainable Development Goals (SDG) outlined by the FAO. As a result, this makes the study foundational in investigating the impacts of Covid-19 pandemic on food security in South Africa's rural households.

1.8. Justification for the study

When studies on food security are conducted, the effects on health - which are connected to the use aspect of food - are given the most attention. This study aims to narrow the gap in rural South African households' access to and availability of sufficient food. By doing so, an economic

perspective on food security is provided, ensuring that policies are created to address the instability of food in rural households.

1.9. Objectives and research questions of the study

Before the Covid-19 outbreak, several steps were taken to address food insecurity in South Africa. The goal of this study is to demonstrate how food security in rural South Africa was impacted by Covid-19 vulnerability, considering the measures that the South African government took to save lives at the expense of livelihoods. The investigation into rural households' ability to obtain enough food during the lockdown is one of the study's primary goals. The study achieves its overall aim through the following objectives, designed to:

- Determine whether food is readily available in rural households; and
- Consider and assess how the social relief of distress grants contribute to ensuring food security.

The following questions direct the investigation:

- Did rural households have food available at their disposal?
- Were rural households able to access sufficient food during the lockdown?
- Did the Social Relief of Distress grant help in securing food?

Answering these questions allows policymakers to improve policies and taking timely measures to create programmes that are feasible for food-secure rural households.

1.10. Scope of the study

This study assesses how vulnerable households are to food insecurity during COVID-19. The study concentrates on South African rural households using the general household survey data conducted by StatsSA in 2020 across South Africa's nine provinces. This survey included only private homes. The capital endowments of the Sustainable Livelihood Framework, which signify household resilience to vulnerabilities, are used to assess household food insecurity vulnerabilities as they affect the livelihood strategies of the household members. The study utilises household vulnerabilities that can be quantified on a household level to support the endowments.

1.11. Structure of the study

Chapter 1 introduces the dissertation. This chapter explains the concept of food security and purpose of the study. By describing the goals and research questions, it also clarifies the study's aim. Additionally, it provides a brief overview of the dataset and theoretical foundation employed in the study.

The literature on food (in)security and family vulnerabilities is discussed in *Chapter 2*. This covers both the theoretical and empirical literature review. While the empirical review incorporates the statistical results from other studies, both reviews offer an overview of how different vulnerabilities and capital endowments influence family food insecurity. Both the national and international level of food security are covered.

The analysis techniques used in the study are explained in *Chapter 3*. Here the reasons for using a quantitative approach are justified by explaining the logit model as applied in conducting the study. All the formulae are detailed, and the chapter equally describes the data selection procedures and the trustworthiness of the data.

In order to illustrate the patterns in food security, *Chapter 4* begins with a discussion of descriptive statistics. The expected signs of the variables in the model are provided by the descriptive statistics. The chapter analyses rural household food concerns further using a regression model that considers capital endowments and household vulnerabilities.

In *Chapter 5* a succinct summary of the study's findings and recommendations are proffered. The limitations encountered are also discussed.

1.12. Summary

The phenomenon of food security is important and needs to be studied continuously because there are different factors affecting human interaction. The rise in the number of Covid-19 cases in South Africa led to changes in human behaviour and the economy at large. Such changes affected people's relationships and how they interact with food. This, for some households, led to food insecurity. The difficulty of the households in accessing enough food for extended periods of time reveals consolidates these fears. Additionally, a household's food security status is reduced if it cannot meet FAO requirements. With a constitution that mandates ensuring food security and a

means of subsistence, South African policymakers were compelled to make choices that benefited the economy while safeguarding the country's population from the virus.

Despite this, the pandemic slowed both global and South African efforts to achieve food security. The capacity to achieve the National Development Plan (NDP) 2030 and Sustainable Development Goals (SDG) of eradicating hunger, using various strategies, was seriously compromised. With the regulations that were introduced, most firms had to reduce their labour force or shut down, which disrupted individuals' livelihoods. The pandemic's upheaval made it more difficult for families to secure food.

The South African government increased other types of grants that already existed and instituted the Social Relief of Distress grant to mitigate the effects that the pandemic had caused, with the hope that this could lessen households' burden and increase household income. Although this brought some form of relief, it has not made up for the high unemployment rate that households face, nor for household's inadequate food availability and accessibility. In many households, food sustainability remains a looming problem. To ensure adequate food policy measures, the study strives to add to extant empirical studies on the need for livelihood protection to reduce household vulnerability to food insecurity. The following chapter, *Chapter 2* examines various theories of livelihood to determine how they relate to food (in)security.

CHAPTER 2

LITERATURE REVIEW

2.1. Introduction

Diverse livelihood strategies were endangered by the COVID-19 pandemic. According to the World Food Programme (WFP, 2005), households must find coping mechanisms that contribute to their food security during periods of crises. They need to learn different methods to ensure that their livelihood strategies are dynamic to cope in all eventualities, most of the time. A review of the literature on food insecurity and household vulnerabilities is provided in two sections of this chapter an empirical and theoretical section. According to Vinz (2022), a theoretical review helps the researcher to develop an argument, while an empirical review elaborates the relevant previous research that is then consolidated in the methods used in current research to solve the problems and the bridge gaps (Long, 2014). Both reviews allow making connections and predictions.

2.2. Sustainable Livelihood Framework

This study explains rural family vulnerabilities and the exploitation of natural resources to ensure livelihood security. We apply the sustainable rural-livelihood framework (Carney et al. 1999). According to Devereux and Maxwell (2001), livelihood security is a long-term perspective on the broader problems of vulnerability, precarity and crises. In their work, Carney et al. (1999) classified livelihood security into five principal groups: human capital, physical capital, financial capital, social capital, and natural capital. The connection between food security and the various capitals is discussed below.

2.2.1. Human capital

Human capital activities, such as educational attainment, employment status of household members and population size, enable livelihood participation (Nawrotzki et al., 2014). According to Compton et al. (2010) a higher level of education may lead to improved job opportunities, increasing the overall income of the household and providing innovative coping mechanisms during unfavourable periods. Similar outcomes may be experienced when more members of the household are employed as there is bound to be a large income basket that allows the household some semblance of security (Hadley et al., 2011). StatsSA (2022) reported that lockdowns triggered by the pandemic contributed to the loss of livelihood and income. However, agricultural

engagements by households increased in 2020. Despite the households' high levels of education and productive work, the loss of a prime-aged adult compromises household food security (Nawrotzki et al., 2014).

2.2.2. Physical capital

In poor areas, household assets are used to measure wealth compared to monetary earnings as income is not the same throughout the year. Wealthier households have more resources to buy food and can re-sell or exchange their physical capital to acquire food (Kirkland et al. 2013). The types of assets referred to include livestock, vehicles or property owned by the household (Mthethwa and Wale, 2021).

2.2.3. Financial capital

Financial capital is the source of income that households can acquire. This refers to savings, income or credit available to households (Mthethwa and Wale, 2021). Social grants are extremely important for safeguarding livelihoods in South Africa (Schatz et al., 2012). The government has offered a few social grants over the years and created the social relief grant during the epidemic. The grants provide a safety net for low-income households and enhance their food security (Patel and Hochfeld, 2011; Schatz et al., 2012). Social grants are essential for preserving means of subsistence (Schatz et al., 2012).

2.2.4. Social capital

According to the social capital theory, having access to resources is associated with less or more institutionalised interactions between acquaintances and long-lasting networks (Bourdieu, 1985). The basic principle of the theory is that a network allows its members to have access to resources that are rooted within the network (Bourdieu, 1985). These networks are usually developed through reliable investment strategies in which two elements are used to govern the relationship: firstly, the social relationship itself where individuals can claim the resources that their associates possess, and the quantity and quality of the resources (Bourdieu, 1985). During crises, households can draw on social capital such as gifts, borrowing and selling of goods and allowances for credit to decrease food insecurity (Goudge, et al. 2009). The South African government, in partnership with various Non-Governmental Organisations and other private stakeholders, distributed food parcels in different communities during the Covid 19 pandemic.

2.2.5. Natural capital

Rural households are highly dependent on natural resources to meet their daily needs and generate income through the sale of natural produce (Shackleton and Shackleton, 2004). These resources provide households with a safety net against food insecurity during times of crises (Shackleton and Shackleton 2011). Ownership of natural capital is an adaptive capacity to economic development, allowing the community and households to engage in subsistence farming. According to Mbajjorgu (2020), in SA, subsistence agriculture is an important protective factor of food systems in rural areas and remains recognized even post-Covid-19. Rural households are more resilient to Covid-19 shocks because of subsistence farming's increased independence from the effects of neo-liberal food systems (Chiwona-Karlton et al. 2021). Land ownership is also a significant economic resource that fosters food security and improved access; thus, these resources tend to increase household agricultural activity and reduce food insecurity amidst shocks (Lipton & Saghai, 2017).

2.3. Empirical Review

2.3.1. Evidence from Nationally Representative Survey Data

The Vulnerability as Expected Poverty (VEP) model was used by Mthethwa and Wale (2021) to calculate vulnerability to food insecurity. By employing panel data from Statistics South Africa's General Household Survey (StatsSA-GHS) 2018, they calculated variances in household food intake per capita. The study used rural household data which consisted of 5520 households from all the nine provinces of the country (Mthethwa and Wale, 2021). The explanatory variables used to estimate the model included the five classes of household resources which are the human capital, financial capital, natural capital, physical capital and social capital.

The study found that human capital shown by the family's average years of education and the age of the head of the household by years has a significant impact on household consumption. These findings demonstrate that investing in education is worthwhile since it enables people to work and earn a living wage. People develop and adjust to coping mechanisms as they age, making them more resilient to shocks and food shortages (Mthethwa and Wale, 2021).

The financial capital measures the number of active investment accounts per house, diversification of household agricultural enterprise, and household income diversification. These constructs were

found to be positive towards household future consumption (Mthethwa and Wale, 2021). However, the amount of remittance received by the household was negative. This implies that remittances are not a stable form of income; they cannot make households resilient against shocks.

Natural capital variables are indicated by access to irrigation, the amount of land used for agriculture, and environmental issues that the household has faced in the past year. A dummy variable was used to measure irrigation access, with 1 denoting that a family has access and 0 denoting that it does not. Households with access to irrigation have stable patterns of consumption compared to those who do not (Mthethwa and Wale, 2021). Households that find themselves in areas that are within high environmental stresses become highly insecure.

The index measuring asset endowment (movable) per family, livestock holding in tropical livestock units, and other physical capital indicators were all negative. This implies that it is challenging for households to sell or exchange their possessions for food during a shock. Members of social groups per home, a measure of social capital, are good. The more social groups that the members of the households are a part of, the more information and resources they have access to when faced with shocks. This lessens food insecurity within households. Vulnerability to food insecurity is therefore a major construct in understanding the impact of the Covid 19 pandemic of households in South Africa. The next section scrutinises evidence from the global food crisis of 2008 in order to make connections to the more recent crises.

2.3.2. Evidence from the 2008 global food crisis

A dataset from the Agincourt Health and Demographic Surveillance System (2008) was utilized in a study by Nawrotzki, et al. (2014) to examine how the 2008 global food crisis affected vulnerable rural families in South Africa. This is an annual household survey in the rural areas of Mpumalanga Province. The survey consisted of 11 988 households which is a panel dataset from 2004 to 2010. The study measured changes in food security across time for the periods; pre-food crisis covering the years 2004 to 2007, the period during the food crises that is 2008, and the period post-the food crisis period over the years 2009 to 2010. Two models were utilised in the study to gauge food security. The first method was the Random Slope Additive model and the second was the Cross-level Interaction model (Nawrotzki, et al., 2014).

Using the additive model, there were improvements seen in food security over the study period in the area, but this increase showed a non-linear growth curve decreasing at a positive rate. From the regression model, it is realised that when the second-order polynomial for time is added, the coefficients of the variables become negative (Nawrotzki, et al., 2014). The models demonstrate a favourable relationship between high levels of education, physical asset ownership, and having more than one family member employed. Additionally, households headed by migrants and with a higher proportion of dependents had better food security than households headed by women, those that had lost an adult family member, those that only received grants as a source of income, and those that lived in areas with access to natural resources.

The cross-level interaction model showed systematic changes for all the secondary predictors with time variables for the households (Nawrotzki, et al., 2014). Between the years 2004 and 2010, households with a lower proportion of working members had their food security improved. Those receiving child grants compared to non-recipients also showed an improvement in their food security status. Households that were headed by migrants also had relatively high levels of food security. However, in 2006, the latter households also started to report an increase in their food insecurity status and by the end of 2010, these households were already reporting even higher levels of food insecurity compared to their counterparts. Refugees from Mozambique in the villages reported a lower food security status as their livelihood security gap started to widen during the period of the study. In this model estimation, the ability to access natural resources had a more positive impact over time than those with little or no access to these resources at all (Nawrotzki, et al., 2014). Initially, households that consisted of a high number of elderly members were food secure compared to their counterparts, but over time this trend shifted. By the year 2010, female-headed households were reporting increased food security compared to households that were headed by males.

2.3.3. Evidence from Ethiopia

Another study seeking to identify the determinants of household food security was conducted by Hussein and Janekarnkij (2013) in Ethiopia. The data for their study was collected from 160 households in the Jijjiga district. The households in the sample size were randomly selected based on their topography, whereby 93 of these households were from a lowland stratum and 67 were from the midland stratum. The data from these households was obtained through a structured

questionnaire. The study used the logit model to estimate food security in order to find the odds ratio and marginal effect of food security.

The estimated independent variables in the study are extracted from the sustainable livelihood framework. Before regressing the model, it that the study confirmed that of the 160 households sampled, only a certain number could access services to fertilizers at 51%; extensions were 70%; veterinary was 34% and credit was 31%. The results from the estimated logit model and the marginal effect show that households that used fertilizers are positively impacted and tend to be food secure and were significant at less than 1%. The marginal effect of the use of fertilisers was 0.84%, indicating that household farmers using fertilisers are 84% food secure compared to those who do not. This study does demonstrate that money has a beneficial impact on food security, with a marginal effect size of 0.0012, which is generally associated with a household reporting a decent income. This suggests that the household gets 0.12% more food secure for every 1 birr rise in total income.

The topography of the area shown in the estimation equation as agro-ecology stratum was found to be negative at less than 5 percent, and the marginal effect of the variable is -0.96. This means that a shift of the household from the midland to the lowland decreases its probability of being food secure by 96%. The following variables: access to veterinary services, extensions and credit, reported positive outcomes towards food security respectively. The marginal effect of access to veterinary services shows that the ability of households to access this service increases food security by 36%. For households that can gain access to extension services, their food security increases by 46 percent and lastly, the ability to access credit increases household food security by 141 percent. Whereas this study had different measures for food security, its findings have an important aspect to contribute to our understanding of the complex situation in South Africa under the threat of Covid 19. The following section seeks to make the connections and extrapolation.

2.3.5. The state of food security in South Africa

In order to meet the population's nutritional demands, South Africa is viewed as a country that produces adequate staple foods and could import food only when there is a shortage. Rural households, on the other hand, are food insecure, according to Altman et al. (2009). The country's agricultural sector is divided into the subsistence sector and commercial sector, which is highly capitalized (Baiphethi and Jacobs, 2009). Subsistence agriculture is normally situated in areas that

were categorised as homelands by the apartheid regime (May and Carter, 2009). The 2019 and 2021 GHS report shows that food accessibility limits have changed. According to the 2019 survey, it was only 17,8% of households that had limited access to food which increased to 20% in 2021. In 2019 there was 11,5 % reported inadequate access to food while in 2021 over 10% of households in South Africa reported inadequate access to food and in both periods, households that reported severely inadequate access were over 6% (StatsSA, 2020 & StatsSA, 2023). In these periods Mpumalanga province reported the highest inadequacy to accessing food at 12,3% in 2019 and 14,3% in 2021. Amongst others, there were provinces such as the Free State, Northwest, Northern Cape and Western Cape whose access to food was also severely curtailed. Figure 5 and 6 below shows the situation of food access in South Africa.

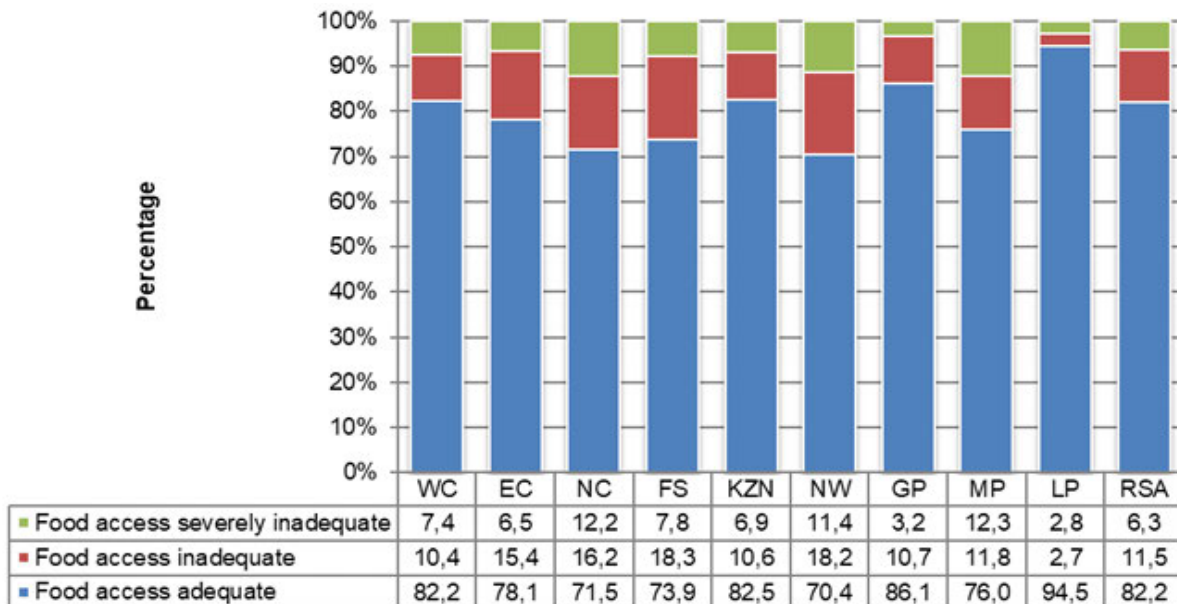


Figure 5: Percentage of households experiencing food adequacy or inadequacy by province, 2019

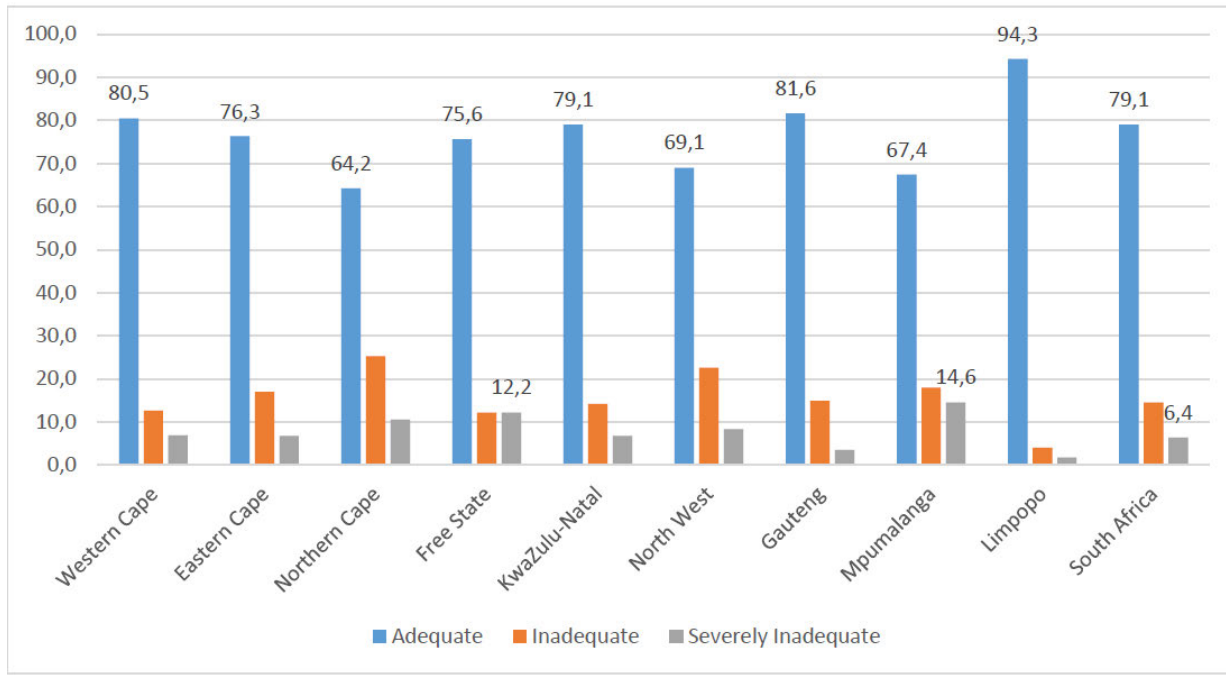


Figure 6: Provincial household food adequacy distribution

Source: StatsSA, GHS (2021)

As much as most households reported adequate access to food, those that reported inadequate access suggest that there are still households faced with food insecurity in South Africa. Many of these households that were reported to have inadequate access to food were led by females in South Africa (StatsSA, 2023). This amplifies further the fact that the country still contends with gender disparities issues.

Table 3: Levels of adequacy in accessing food by sex of the head of the household

Sex	Adequate	Inadequate	Severely inadequate
Male	8 459 936 (81,3%)	1 369 343 (13,2%)	570 903 (5,5%)
Female	5 727 809 (75,9%)	1 243 012 (16,5%)	575 568 (7,6%)
South Africa	14 187 745 (79,1%)	2 612 355 (14,6%)	1 146 471 (6,4%)

Source: StatsSA (GHS, 2021)

According to the 2014/2015 Income and Expenditure Survey, housing, transportation, and food costs dominated South African household spending patterns. This indicates that these three expenses account for a sizeable part of household income. A greater share of the household budget during the years of the survey was spent on transportation than on food. This was due to the rapid

growth of the economy and increase in incomes. The report continues to explain that as household income increases, transport and food expenditure also increases in the opposite direction when measured as a ratio of total consumer expenditure. There are obvious matters connected to food insecurity as discussed above, but there are equally complex patterns on vulnerabilities that require further enquiry as set out in the research questions that this study addresses.

2.4. Conclusion

To understand household vulnerabilities, it is important that the capital endowments are studied as they influence household livelihood strategies and decisions on how to run the household and protect it from unforeseen circumstances. In the event of the pandemic, for instance, human capital was important in that people needed to learn about the virus and its effects, thus having a household full of educated members they could teach each other on the information they received, and they were able to discern the validity of the information and could spread it within their circles. As indicated in the various studies in the empirical literature, education not only affords people to read but also helps them get better jobs which still allowed them to participate in the economy even during the lockdowns. This sustained household physical and financial capital and reduced food insecurity.

Social capital in the form of government subsidies or assistance significantly affects households' food security, especially if it is to be supplied on a regular basis. Utilising natural resources enables households to boost both their income and food security. In times of hardship, households may use their natural resources more creatively and earn more money, thereby boosting their chances of obtaining and accessing various types of food that they were unable to produce with their natural resources.

It is also essential for rural households to have access to amenities like irrigation, veterinary care for their animals, and fertilizers. As evidenced by the 2008 global food crisis, women empowerment has been one of the keys in ensuring that households have access to food. As of 2010, homes headed by women began to report higher levels of food security than households headed by men, whereas in 2021 a higher number of households headed by females reported inadequate access to food In South Africa. This indicates that empowering women is essential to ensuring the long-term food security of the household. The following chapter, Chapter 3 explains, the methodology used to execute the study.

CHAPTER 3

METHODOLOGY, AND DATA COLLECTION

3.1. Introduction

The methodology chapter is the foundation of any research project, providing a comprehensive framework for carrying out the study and answering the research questions. It outlines the specific methods, procedures, and techniques used to collect, analyse, and interpret data. This chapter focuses on the critical aspects of the research methodology and data collection, providing insights into the systematic process that forms the basis of this research.

This chapter begins by discussing the type of research method and the motivation for using the method. It then proceeds to discuss data collection and its reliability, the research methodology employed in the dissertation as well as discussion.

3.2. Distinguishing the Study

According to Van Biljon (1999), a researcher must indicate whether their research project is a quantitative or qualitative study. This study follows a quantitative study approach to show household vulnerability to food insecurity during Covid-19 in South Africa. Using a quantitative approach has various advantages which could help policy makers in effective policy formulation and accelerating the implementation of those policies. These advantages include the fact that the data is generated in an objective manner to reduce subjective interpretation and make statistical inferences (Long, 2014). The goal of quantitative research is to collect data from a representative sample of the population. Researchers then make statistical conclusions and generalise their findings to a larger population from a sufficiently big and diverse sample (Leedy and Ormond, 2001). This broadens the research's applicability and improves its external validity. Quantitative methods make it easier to analyse data using various statistical techniques such as the logit technique utilised to uncover patterns, trends, correlations, and statistical significance in data in this specific study. This analysis provides useful insight in comprehending the findings. Furthermore, statistical tools assist researchers in drawing conclusions and making predictions based on the data. Quantitative research involves collecting data in a structured and standardised manner, which enables other researchers to replicate the study (Africa, 2006). Replication is a crucial aspect of scientific research, as it helps verify the findings and increases confidence in

them. By using quantitative methods, researchers provide detailed descriptions of their data collection procedures, making it easier for others to replicate the study. Certain research problems necessitate exact measurement and quantification thus the use of quantitative approaches helps to measure variables such as opinions, behaviours, attitudes, and attributes (Africa, 2006). Researchers can use these metrics to compare and interpret data from different groups, situations, or time periods. Lastly, a rigorous and systematic data collection and analysis is provided by quantitative research (Leedy and Ormond, 2001). Quantitative data informs evidence-based decision-making in a variety of sectors, including business, medicine, social sciences, and policymaking. Quantitative findings can be used by researchers to discover trends, evaluate the effectiveness of treatments, and assist data-driven decision-making processes.

3.3. Data collection

To conduct the econometric analysis, the GHS 2020 survey data was used due to the suspension of the face-to-face data collection method and restrictions imposed because of the Covid-19 pandemic. Instead of using Computer Assisted Personal Interviews, StatsSA changed to Computer-assisted Telephone Interviews for the 2020 data collection (StatsSA, 2020). This data was collected between September and December 2020, and the GHS 2019 sample was re-used by survey officers to contact households. The survey comprises private households and from South Africa's nine provinces.

The nation was divided into 103 576 enumeration areas (EAs) in order to prepare for this census, and these EAs, combined with the supplementary data, served as the primary sampling units (PSUs) for the master sample. The master sample comprises approximately 33 000 residential units across 3 324 PSUs. Due to its lower coefficients of variation and potential to boost the accuracy of the GHS estimates, this master sample was chosen.

3.4. Methodology

The method used to conduct the empirical analysis is the logit model, where the dependent variable is a binary variable. This estimation analyses the likelihood of an event taking place and because the four components of food security can either take place or not, they cannot be regressed using a linear model. The advantages of employing the logit model are that independent variables can also be regressed using the log odds to find their linearity towards the dependent variable. This

type of regression also gives the direction of the variables estimated. This is good as the study expects that the policymakers can utilise the research in improving future measures for rural households when faced with shocks. The study mainly highlights the availability and accessibility of food to households and the logit model is appropriate.

Food security is the study's dependent variable, which is given a value of 1 if the household has access to enough food and a value of 0 otherwise. The five asset classes - human capital, physical capital, financial capital, natural capital, and social capital provide the main independent variables. The age of the household head, the average level of education in the home, and the head of household's health state are used to calculate human capital. The livestock and mobile assets owned by the household serve as indicators of physical capital. The income that households receive, remittances, and active investment accounts count as financial capital. For natural capital, the yard's amount of land used for agriculture, access to irrigation and access to woods are used as measurement. The number of members of social groups that make up the home is used to calculate social capital. The percentage of households that are used and the number of people who live with disabilities are additional independent variables that should be considered.

To do the estimation, the descriptive statistics of the raw data are tabled out to show the properties of each variable in the dataset. Then the following estimation equations for the logit model are used:

$$P_i = Y = \frac{1}{X_i} = \frac{1}{1 + e^{-z_i}} = \frac{e^{z_i}}{1 + e^{z_i}} \dots 1$$

In equation 1, P_i indicates the likelihood that the household would have enough food. Y is the food status of the household. X_i is a set of independent variables of the households and representing the exponential term.

The linear expression of the independent variables is expressed by equation 2 below:

$$Z_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \dots + \beta_n X_n \dots 2$$

Since food security is a binary variable, when a household is found to be food insecure equation 1 is represented by $1 - P_i$ and can be written as:

$$1 - \frac{1}{1 + e^{-z_i}} = \frac{1 - e^{-z_i}}{1 + e^{-z_i}} = \frac{e^{-z_i}}{1 + e^{-z_i}} \dots 3$$

The formula used to calculate the odds ratio is.

$$\frac{P_i}{1-P_i} = \frac{1+e^{z_i}}{1+e^{-z_i}} \dots 4$$

where $\frac{P_i}{1-P_i}$ demonstrates the ratio of the likelihood that the home would have enough food. To linearise equation 4, the natural logarithm taken produces equation 5:

$$L_i = \ln\left[\frac{P_i}{1-P_i}\right] = Z_i \dots 5$$

In equation 5, L_i represents the logarithm of the odds ratio assumed to be linear for all the parameters and variables. From here, the logit model is estimated using equation 6:

$$Z_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \dots + \beta_n X_n + \varepsilon_i \dots 6$$

where β_n is the parameter of the model, X_n represents the independent variables and ε_i is the error term. When using the logit model, it is necessary to estimate the marginal effect. To calculate the marginal effect (which shows the percentage changes in the estimated independent variable toward the dependent variable), equation 7 is written as follows:

$$\frac{\partial P_i}{\partial X_i} = P(1 - P_i)\beta_i \dots 7$$

3.5. Conclusion

The objective of the study's quantitative methodology is to provide empirical information regarding the level of food security during the Covid-19 epidemic. Using the logit approach data from the 2020 GHS, evidence on present food security provides an indication on households' status in the country. Using the dependent variable as a binary variable also gives a linear relationship while showing the inverse of the independent variables. This method offers policy makers with an accurate probability of future household food security and makes it easy for them to forecast and decide on the policies that needs to be implemented first.

CHAPTER 4

ANALYSIS, EMPIRICAL RESULTS, AND DISCUSSIONS

4.1. Introduction

The economic analysis of food (in)security is presented in this chapter. The chapter also discusses the regression results. In the descriptive data presentation, the various variables are described in terms of their asset classifications and how they are assessed, along with the variable code that was utilised in the study for the regression. In the discussion of the logit model regression, the significance of the independent variables on the dependent variable and the marginal effects of each of these regressions are emphasised.

4.2. Results and analysis

Many studies define food security vulnerability as the ability to purchase food, although some households can grow their own food in their backyards. As a result, rather than using a continuum to quantify food (in)security, this study uses a binary model. Here, the ability of the household to never run out of food at any time is referred to as food security. The dependent variable was derived from a household survey and was used to ascertain whether households ran out of food as a result of a lack of funds or other resources. Table 4 below shows the statistical table of variables that influence household food consumption, together with their expected signs.

Table 4: Descriptive Statistics and Expected Signs

Variable Code	Description	Mean(SD)	Min(Max)	Expected sign
Food Security	Household food security status.	0.8227(0.3819)	0 (1)	Response variable
Capital Endowments				
Human Capital				
hh_sex	Head of the household sex (Male=1 and female =0)	0.5081 (0.4999)	0 (1)	+ if a male and - if female
hh_age	Age of the household head (age from 14 years)	53.1945(14.3695)	14 (105)	+

hh_educ	The level of education of the head of the household	2.6593 (0.7840)	1 (4)	+
hh_econact	Household economic activity status	0.8871 (0.9258)	0(7)	+
Financial Capital				
lnhh_income	Log of household income excluding additional income sources in rands	7.0360(1.2556)	1.8325(16.1181)	+
lnremm	Log of remittances received by the household greater than R350	14.9747(2.8163)	5.9914(16.0003)	+
covid_grant	Social relief of distress grant	24.1747(15.0634)	0(112)	+
income_agrigoods	Income from agricultural goods harvested by the household	0.0035(0.0597)	0 (1)	+
add_hhincome	Household additional income	0.0133(0.1149)	0 (1)	+
Natural Capital				
water_acc	Household access to water.	2.0371(2.9085)	0(14)	+
hh_grownfood	Household agricultural activity	1.0626(0.2423)	1(2)	+
Physical Capital				
veh_ownership	Vehicle ownership	.2404(.4273)	0(1)	+
l_stock_ownership	Livestock ownership	.3642(.4812)	0(1)	+
Social Capital				
social_relsh	Social relationships	4.9104(2.7247)	1(23)	+
Household Vulnerabilities				
hh_disab	Household member disability	0.1832(0.5440)	0(7)	-
hh_covidstat	Household member covid status	0.0662(0.3984)	0(9)	-
Institutions				
hh_grantrep	Number of members in the household receiving grants	2.3880(2.5072)	0(99)	+
settlement_type	The geographical location of the household	0.4641(0.4987)	0 (1)	+

Beginning with the capital endowments for human capital, the age of the heads of the household in rural South Africa is on average individuals in their early 50s. People in this age group are

mature enough to establish their livelihoods (Mthethwa and Wale, 2021). This helps households to secure food over a long-term period, reducing future shortages. The average degree of education for the household head is measured by the level of study. Households with greater education are less likely to experience food insecurity because family heads that are highly educated are more likely to find stable and well-paying employment opportunities (Bogale and Shimelis, 2009). The mean value in the table above illustrates that most rural households are dominated by individuals with secondary education without matric, which poses a high level of vulnerability to households. However, if the heads of the households continue with their education, household food insecurity patterns changes positively as they are more likely to cross paths with high paying opportunities. During the pandemic, most institutions had to close or downsize their workforce, and this destabilized the household income and resilience to food insecurity. This means families could remain food resilient if they were able to keep their occupations and engage in the economy throughout the Covid-19 period. The mean value 0.8871 for household economic activity status shown in table 4 indicates that there is minimal household economic participation and this negative impact on household food security. However, if rural household economic activity increases the households will be food secure.

Given they have a variety of livelihood options to deal with shocks, households with a diversity of income sources are less likely to experience food insecurity, claim Mthethwa and Wale (2021). The various levels of income among the household members raise the household's wealth, which lowers susceptibility, in terms of financial capital. According to StatsSA (2020), remittances are funds that a household receives from individuals who do not reside in the same housing unit as them. This type of payment raises the household's income and can also be thought of as a gift. In general, a household's chance of experiencing food insecurity diminishes with the number of remittances it receives. According to the Special Covid-19 Social Alleviation of Distress award criteria, rural households were able to keep up their food consumption throughout the pandemic. Any additional source of income, including rental income and income from the sale of agricultural products like animals, crops, poultry, food gardens, forestry, and fish, provides a reliable source of income that ensures the household has access to enough food. The social relief of distress grant introduced by the government also added to the financial status of the household giving unemployed household members the dignity to contribute towards the household income thus increasing the household ability to reduce food insecurity.

Looking at natural capital defined as assets that provide environmental services for economic production are essential components for household food security (Missemer, 2018). Households with land to farm on, regardless of the size of the land, can access food more than those that do not have it. This has a favourable impact on the household's capacity to maintain its current and future level of food security. The household's items generated on its land may also be sold to generate revenue, depending on the extent of the land it owns (Lokosang et al. 2011). The more land owned by the household, the more agricultural goods they can produce for household consumption. Shown by the household agricultural activity, on average rural households in South Africa have at least one farmland to use to engage in agricultural activities. This engagement could be to produce household food and resale of the goods produced and remain food secure. Having access to water is also an important factor that has a positive effect on household food security. The mean value 2.0371 depicts that two rural households on average have access to water in their yards or 5km within the radius of their homes. This means that the majority of households are prone to food insecurity because they need to fetch water away from their yards as water is needed for irrigation to help in reducing the production risk of agricultural goods and sustain good crops, particularly in areas faced with frequent drought (Mthethwa and Wale, 2021).

Households owning physical capital such as livestock are expected to have a positive food security status in the present and in the future (Bogale and Shimelis, 2009). This is because when faced with shocks, these households can sell the livestock or they can use it as collateral to acquire credit from institutions (Altman, 2014). The average value of livestock ownership in South African rural households is less than one and that is an indication that some rural households experienced food insecurity during the pandemic. Ownership of vehicles is expected to yield positive results in the short run as they can be sold or used to distribute goods to earn an income during periods of vulnerability so that consumption can take place. However, during the pandemic, the mean value of rural households that own a vehicle is less one meaning that households that owned a vehicle could not sell them in exchange for cash or for engaging in transportation services for goods or people to earn an income and this resulted in household food insecurity. With social capital, having household members who are part of societal groups increases social networking circles and connections, which plays a vital role when faced with disruptive shocks. Connections are also important, especially when members relate to people who have higher job opportunities (Lokosang et al. 2011). This has a positive impact on food security because the circles that these members

belong to are able to share the information on food distribution centres when there are food parcels to distributed in their areas and any form of training on how to combat food insecurity for households.

The number of family members who tested positive for Covid-19 as a kind of shock is included in the model as an independent variable. When one tested positive for Covid-19, they had to quarantine for two weeks. This meant less productivity for these individuals and to some extent, the virus claimed their lives, thus leading to loss of livelihoods and increasing vulnerabilities also leading to increases in household food insecurity. Due to the structural challenges, they encountered, households with a higher percentage of individuals with disabilities experienced the same situation, however, average value of rural households with members living with disabilities is less than one which means there is household burden relief in most rural households.

Public cash transfers, sometimes known as social handouts, are intended to give recipients better access to nutritional services, income and food security, and other benefits (Altman, 2014). Table 4 shows that on average 2 members in a household were recipients of these transfers. As much as many vulnerable rural households were assisted through this programme in South Africa, it still had a negative impact due to people feeling entitled and having certain expectations about the amount to be transferred. Thus, it was challenging to comprehend the connection between household vulnerability to food insecurity and social handouts due to the absence of legal guidelines and restrictions on how to spend this money.

Table 5: Food security Logit and significant model

Variable	β	SE	Odds ratio	P
Human Capital				
hh_sex female	-.0702	.0467	.9321	-0.0703
hh_age	.0213	.0020	1.0215	0.0213***
hh_educ				
2. Primary education	.1759	.0662	1.1924	0.176**
3. Secondary education	.5993	.0729	1.8210	0.599***
4. Tertiary education	.9294	.1594	2.5330	0.929***
hh_econact	.0060	.0391	1.0060	0.00607

Financial Capital				
lnhh_income	.5492	.0392	1.7318	0.549***
lnremm	-.0623	.0076	.9396	-0.0623***
covid_grant	-.0007	.0023	.9992	-0.000726
income_agrigoods	.1690	.3545	1.1841	0.169
add_hhincome	.3121	.3569	1.3663	0.312
Physical Capital				
veh_ownership	.6750	.1011	1.9641	0.451***
l_stock_ownership	-.0955	.0597	.9088	-0.0956
Natural Capital				
water_acc	.0055	.0068	1.0049	0.00490
hh_grownfood Source of food	.1684	.1349	1.1834	0.168
Social Capital				
social_relsh	.0516	.0158	1.0529	0.675***
Vulnerability				
hh_disab	-.1042	.0359	.9010	-0.104**
hh_covidstat	-.1641	.0494	.8485	-0.164***
Institutions				
hh_grantrep	-.0888	.0156	.9149	-0.0889***
Constant	-2.7039	.3068	.0669	-2.704***
* p<0.05, ** p<0.01, *** p<0.001				

Table 5 shows the results of the logistical model. The table shows the value of the coefficient, standard error, odds ratio, and the variables' significance of food security at three levels 5%, 1% and 0.1% respectively.

From the human capital, households headed by females show a decrease in rural household food security as expected from Table 4. This implies that these households were vulnerable compared to houses headed by males. When a household was led by a woman during the Covid-19 pandemic, the likelihood that it would have more food security than scarcity increased by 0.9321%. When a woman is the head of the household, there were considerable levels of food insecurity (0.1%). The family head's degree of education reported an improvement in food security. Comparing the three

categories of education level, households grow more secure in their access to food and less vulnerable as education levels rise. Primary education is significant for the household at a level of 1%, while secondary and tertiary education is relevant at a level of 0.001. The family head's age and the level of economic activity throughout the pandemic, however, indicated an improvement in food security, if nothing else. The percentage decrease in the likelihood of being food secure is, respectively, 1.0215% and 1.0060% when all other variables are held constant. The household head's age has a probability value of 0.001%, making it important. Having remained economically active during the COVID-19 distress period had a positive response toward food security. Human capital endowments have a positive sign towards household food security. It is important for the heads of household ensure that the members of the households also acquire these assets to remain food secure.

During the pandemic, all households had to ensure that they did not run out of food because of the movement restrictions that were imposed by the government. This reduced remittances that were received by households. This is shown by a negative relationship between food security and remittances, *ceteris paribus* as reported in Table 5. This is an indication that households should not depend on gifts as they will not be received every time, they need them. The same effect is seen in the Social Relief of Distress grants. Since the grant was only introduced for a certain period, it was a temporary measure to ensure that those who lost their jobs and those unemployed could have an income. These incomes increase and diversify the wealth of the household. However, during the pandemic, it was difficult for rural households to retain these types of income. The total household income, income from agricultural goods, and household additional income were the main financial capitals that households relied heavily upon and had a positive impact on food security, reducing vulnerability. The percentage change of household food security is 1.7318%, 1.1841% and 1.3663% when all other factors are held constant. Both the total household income and remittances are significant at 0.001%. Financial capital plays a vital role in household food security, and it is important for a household to have a stable income that they can rely on instead of money received as a gift. This variable shows that a household requires a stable income to remain food secure. It was very important for households to maintain their income to remain food secure during the pandemic.

It is important for rural households to own at least one moveable asset to escape shocks when they arise. With the physical capital, ownership of livestock was found to be negative while ownership of a vehicle was found to be positive. This implies that households owning motor vehicles were not prone to vulnerabilities as they could convert these goods into cash and buy food, whilst owning livestock during the pandemic increased household vulnerability. Households cannot depend on livestock goods as a long-term solution to reduce vulnerabilities because they could not use them to take credit as the economy was also sinking. All the physical capital variables show an increase in the odds of household food security. However, it is only the ownership of a vehicle that is statistically significant. This shows that when considering buying physical stock, it is important to know how quickly the stock can be converted to money or used to make money.

All natural capital variables were found to be positive. Having access to water and using the household land to grow one's own food is important. Having access to water improves the irrigation system to ensure good nurturing of agricultural goods grown by the household. As more goods are grown, the rural households get to be food secure. This is an indication that during the time when movement was restricted, household members could get food from their own yards. Hence, when the household is engaged in agricultural activities, they have a more stable consumption than those that do not. This implies that household food security is dependent on natural capital.

Social relationships are important, particularly during times of distress. They help in spreading the correct information and the more members engage in social affairs, the lower the household vulnerabilities. Therefore, the variable social relationships and household food security are positively correlated, as shown by coefficient variable *social_relsh* in table 5. This is also clear because the variable has a significant impact as the odds ratio to food security is greater than 1. Household food security is negatively correlated with structural vulnerabilities within the household, such as member disability and Covid-19 status. Families with impaired individuals are a little more vulnerable to consumption. Table 5 also demonstrates that households with more grant beneficiaries are more susceptible. This could be due to the sense of entitlement and certain expectations from the recipients because these grants are thought to be the safety nets of poorer households. Other studies have found that social grants are a short-term solution for these households as they create a dis-incentive effect that hinders the development of entrepreneurship

(Mthethwa and Wale, 2021). For such a programme to provide shock protection, it must be re-designed to suit rural households.

4.3. Marginal effect results

Table 6 to 9 below display the analysis of the marginal effects by comparing the level of household food security for households led by females and males at different ages. The maximum age of the head of the household is 65 years. This is because the average life expectancy in South Africa is 65 years (StatsSA, 2022).

Table 6: Food security measured by the head of the household’s level of education.

Female-headed household by age	Achieved tertiary education	Achieved secondary education	Achieved primary education
15	.7738	.7158	.6309
25	.8069	.7542	.6749
35	.8363	.7892	.7163
45	.8623	.8206	.7546
55	.8848	.8485	.7896
65	.9041	.8728	.8210
Male-headed household by age			
15	.7851	.7288	.6456
25	.8170	.7661	.6888
35	.8453	.7999	.7293
45	.8700	.8302	.7666
55	.8915	.8569	.8004
65	.9099	.8801	.8306

Education significantly affects a household's capacity for resilience. The more educated the head of household is, the more resilient the household becomes to vulnerabilities for both men and women. Education helps people make informed judgments and assists with getting formal employment. In a case where the household produces agricultural goods for the purpose of increasing their income, having a better knowledge of the market ensures that they grow goods that their niche demands. They also make decisions that keep them food secure and avoid vulnerabilities in times of shocks. Through education, they can build social networks that keep

them updated on any changes in the economy. From the table, it is shown that households led by older individuals who obtained some form of tertiary education tended to be more highly secure than those who achieved primary and secondary education only. Even though this is the case, gender disparities are also evident in households that have achieved tertiary education, women remain nonetheless more susceptible to hunger than men.

Table 7: Food security measured by household Covid-19 status.

Female-headed household by age	Covid-19 Negative	Covid-19 Positive
15	.6706	.6373
25	.7116	.6802
35	.7498	.7206
45	.7848	.7581
55	.8164	.7924
65	.8445	.8232
Male-headed household by age		
15	.6844	.6517
25	.7245	.6938
35	.7617	.7334
45	.7956	.7698
55	.8260	.8029
65	.8530	.8325

Household experienced an incredible shock as a result of the Covid-19 virus. Food insecurity declines with age of the head of the home, while household vulnerabilities rise when Covid-19 testing is positive. If the household consists of members who tested positive for the virus, they were prone to food insecurity especially for households that were headed by older people. This emanated from the fact that the individual would have to be inactive for a period of two weeks until they fully recovered. This de-railed the household structure and for households led by females testing positive led to increased food insecurity, as compared to those led by males. As shown in Table 7, if the household is headed by a female who is in her 50s, for every positive Covid-19 test, the household would only be 0.7924 food secured while male-headed households would be 0.8029 secured.

Table 8: Food security measured by means of the social relief of distress grant.

Female-headed household by age	Social relief recipient	Not receiving the social relief of distress
15	.6721	.6722
25	.7130	.7131
35	.7511	.7512
45	.7859	.7861
55	.8174	.8175
65	.8454	.8455
Male-headed household by age		
15	.6858	.6860
25	.7259	.7260
35	.7629	.7631
45	.7967	.7968
55	.8270	.8271
65	.8538	.8539

Table 8 demonstrates that a family with individuals who got the R350 Social Relief of Distress award were able to lessen their susceptibility to hunger, while families who were not reliant on this grant had even greater insecurity. This suggests that the grant could be used by all households, whether they were headed by a woman or a man, to provide food security and access to nutritional services. The table shows how grants can be used by households to lessen vulnerabilities, but it is crucial that they do not rely solely on these cash transfers as they can be stopped when the government realizes a financial burden.

Table 9: Food security for households' agricultural goods

Female-headed household by age	Home grown food used as source of food	Home grown food used as a source of income
15	.6571	.6224
25	.6990	.6661
35	.7382	.7075
45	.7743	.7460
55	.8070	.7814
65	.8362	.8134

Male-headed household by age		
15	.6712	.6370
25	.7122	.6800
35	.7504	.7205
45	.7854	.7581
55	.8170	.7923
65	.8450	.8232

It is vital for rural households to engage in agricultural activities. They may do so in order to grow goods for income purposes or for household consumption. However, in periods where they are faced with shocks, the goods must be used for household consumption. The chances of the household never running out of food are high when agricultural goods are used as a source of household consumption since they will supplement this with income earned. Since movement was restricted during Covid-19 agricultural goods were used for household consumption. Hence, Table 9 reveals an increase in food security for households that used these good as a source of household food. It is evident that when the head is 65 years old, the household is even more food secure when they produce food as a source of household consumption. This is because they have better farming skills and know how to grow and store food so that it can also be used in the long term.

4.4. Conclusion

Prior to the Covid-19 pandemic, the country had a food crisis at the household level. This was due to various vulnerabilities faced by the households which were not empirically evident. The results presented here do not show future consumption patterns but can be used to generate solutions to keep households from running out of food under shocks such as Covid 19. To show food (in)security using vulnerabilities was a better choice as rural household members were faced with shocks.

Capital endowments in their various categories are important in keeping households’ food secure. The significance of human capital shows that there is a strong need for the economic enhancement of household members. Food security is dependent on household economic activity. Having stayed employed when most institutions were closing due to Covid-19 regulations was important and kept households away from vulnerabilities. Whether household members are highly educated or not, if they are participating in the economy, the household faces fewer vulnerabilities. Being highly

educated means, one could get a job that kept them participating even when they were at home. Such individuals kept their families afloat.

The need for a good financial capital status is vital to reduce vulnerabilities. The likelihood that a household would have access to food could increase the less reliance of the household on gifts because they only come after a certain period, and it was rare that they received them when they needed them. This means that as more of the household members contributed towards the income of the household, the more food secure the household becomes. It is also important that members are not dependent on the grants alone. They should use the grant money to create a secure stream of income so that the household depends on a stable income. In addition, ownership of moveable assets reduces food insecurity. Households can sell these assets to acquire extra income, or they can use these types of assets to distribute the goods that they produce from their gardens and buy more food.

It is, however, important that households have access to water and land that they can cultivate. By accessing water close by (less than 5km from their yard) or in their yard, they form irrigation systems for the goods that they produce, whether on a small or large scale. Access to land that can be cultivated and depending on the size of the land, members can engage in agricultural activities for the household and local market production. Ownership and access to natural resources were crucial in reducing food insecurity because they allowed household members to access their own produce in their yards, which decreased their risk of getting the virus.

The Marginal Effect model highlights the fact that families headed by women are still more likely to experience food insecurity than households headed by men. Even after many years of women's empowerment being preached, there is still an existing gap between the two narrative on gender equity and success. It is important that policies become inclusive of both males and females in the development of households' resilience to food insecurities. The household tends to become more resilient to vulnerabilities as the head of the household gets older, and the households become more food secure. Using the logit model illustrated household ability to resist vulnerabilities and remain food secure.

CHAPTER 5

CONCLUSIONS AND POLICY IMPLICATIONS

5.1. Conclusion

The study's objective was to evaluate the availability and accessibility of food during COVID-19 in rural South Africa and to assess household susceptibility to food instabilities. According to the study, most rural households relied on food produced in their backyards. The secondary source of food is the local markets for these households which they were restricted to visit, and which were often very far from their homes. It was established that households with backyard gardens were much more food secure than their peers. According to Altman et al. (2009), there are many South African households who struggle with food insecurity. According to the SLF analysis, households experienced moderate to high, and in some cases severe, food insecurity during the Covid-19 period. According to the empirical study, food insecurity should be treated as a dynamic issue rather than a static one. This ensures that the policies and techniques are used to target both family vulnerabilities as well as current food insecurity.

The analysis further suggests that human and financial capitals play an important role in sustaining rural households' resilience. Improving accessibility to economic activities and education in rural areas allows households to be capacitated with different skills that are associated with being resilient. Access to various financial capitals increases financial literacy and improves a household's independence. The additional income of the SRD is significant and improves households' income status, thus reducing financial dependency while increasing food accessibility. However, it is important that households should not depend on grants and remittances as they are implemented as a temporary solution for households to achieve their food demands. Access to natural resources like land and water are essential. Having enough land means that households can produce different types of food from their backyards, and since one of the regulations to contain the virus was the reduction in movement, rural households are encouraged to actively participate in agricultural activities and produce their own food. Furthermore, ownership of moveable assets such as vehicles reduces food insecurities. Education, labour, land, livestock and infrastructure, according to FAO (2009), are crucial resources for assisting rural people in escaping poverty and enhancing their food security. Social relationships are also important for rural households to face vulnerabilities. These forms of relationships increase their abilities to find strategies that will

improve their livelihoods and stay informed about any necessary information that could help in finding a job and ensuring that their homes have food, and that they can access the different capital endowments necessary to reduce food insecurity.

5.2. Policy Implications

5.2.1. Improved access to education

The marginal effects indicate that when the head of the household has obtained tertiary education then the household becomes food secure. This shows how important it is for the household to be educated and encourage the household members to acquire higher education. Access to education should be prioritised and made easy. Education plays an important role in human well-being and helps with the improvement of livelihood strategies. In rural areas, most people find employment in the agricultural sector, but with better levels of education, they can find jobs elsewhere. Implementing policies that support non-formal education through community engagement such as community or school gardening to create food banks would also teach individuals how to grow important goods such as staple crops and vegetables to remain food secure. That develops farming skills and encourages household subsistence farming. From these non-formal education projects, they learn about use of fertilizers and environmental stressors on the crops. These programmes may also incorporate other forms of learning such as financial education to encourage entrepreneurship skills and finding innovative ways of farming sustainably.

5.2.2. Land conversion, access to land and water

Natural capitals such as land to perform agricultural activity are vital for food security and the results in the previous chapter show that it is important to have access to land and water for the rural households to remain food secure. Most rural areas contain forests which grow plants that are not staple crops. The government can invest in the conversion of these areas to help communities and households access land that is big enough to grow staple crops and cash crops. When this is done, commercial farmers should not be allowed to grab these lands from the smallholders or subsistence farmers. It is important that rural households and /or communities have access to enough land and water to participate in subsistence farming, especially for those who do not have land to use for agricultural purposes. This not only addresses the current status, but also the future household food availability and accessibility, reducing movement to the markets for rural households. This also enables healthy behaviours by means of skills development and

resource empowerment. To ensure that these households remain food secure in the future, continued education on vital agricultural goods, sustainable agro practices, the use of fertilisers and selling of the produced goods to finance the accumulation of assets should be made available in the long-term.

5.2.3. Preserving traditional knowledge for skills development

From the regressions, it is evident that age plays an important factor in household food security as the older the head of the household is the more food secure the households are. It is important that households teach the younger generation the important livelihood strategies that affect socio-demographics so that traditional knowledge, practices, and skills are maintained. These skills can be used with technologies that will result in high crop productivity. The use of both skills ensures continuous productivity and yields security for households present and future consumption.

5.2.4. Economic Activity

Formal salaries are a significant determinant of household food security, and access to employment opportunities would mean that household members have direct access to better income and food affordability. This means that households should not depend only on social grants to meet their needs but should use them as safety nets in times of distress. These grants can also be used as start-up capital for small businesses to create a stable income for the household. Being economically active will reduce vulnerabilities and food insecurity.

5.2.5. Improving communication and access to information

For households to remain resilient, it is important that they have access to information. This can be done by using traditional network methods and technologies, depending on the area's ability to access modern technologies. Rural infrastructure can also be improved to ensure that necessary information reaches the remote areas. The study denotes that social relationships are significant, and it is important that households form relationships with the outside world in order to be able to obtain information and stay informed to be able to engage with the surrounding communities.

5.2.6. Creating food and seed banks

Policies of communal food and seed banks can be drawn up and implemented through community engagement. These must remain communal to be effective as each area has its own characteristics. Their success can be built through social relationships whereby households encourage each other

to donate their home grown, communal or school agricultural goods and canned food to be used in times of emergencies. Keeping seeds is also equally important as shocks are different. Some shocks such as floods may ruin crops and for new crops to be planted, there will be a demand for seeds. For periods such as COVID-19 the demand to plant own food increases as there are movement restrictions.

5.2.7. Market Supply

Since food availability and accessibility is also dependent on market supply, households working on a community garden can use goods from their garden to make a living by supplying local markets. This income can be used to invest in a technological process that reduces water stresses and enhances their productivity while remaining agriculturally resilient.

For **further research**, the study recommends that:

The long-term repercussions of COVID-19 on food insecurity and inequality for rural households should be examined, and

The effects of load-shedding on household food security should also be examined because they widen the already present inequality gap.

5.3. Limitations of the study

The study was initially meant to use the AginCourt dataset. However, after countless phone calls and emails, the dataset could still not be accessed. After a few consultations with economists, the chosen data set was the StatsSA GHS 2020 survey. The data processing from the two organizations is different. The survey questions in the GHS are more modified than the ones from AginCourt. For instance, the GHS assumes that engaging in agricultural activities means the household owns land. The AginCourt questionnaire does ask if the household owns the land that they are conducting their agricultural activities on.

Financial capitals include household savings and investments, which were not included in the 2020 survey. This survey relied on the information received in the 2019 survey, which had to be adjusted during the weighting process because some households provided non-reusable contact numbers, or they were no longer residing in the dwelling units they used to when the 2019 survey was conducted. This could have a significant impact on the regression results.

5.4. Recommendations

Though some limitations were met during the study, policy makers need to ensure that they formulate and implement policies that protect rural households' livelihood strategies so that they remain food secure even when they are faced with events that may have a negative economic impact. They should ensure that rural households are afforded access to the various capital endowments particularly human capital, natural capital, and social capital as they can be used to nurture the growth of the other two capital endowments (financial and physical) and give rise to properly planned institutions that address their communal needs even when faced with periods like the covid-19 pandemic. When formulating educational policies, it is important that they understand the needs of each community to ensure that they implement educational programs that are relevant to the communities of interest.

References

- Abay, K.A., Berhane, G., Hoddinott, J. Tafere, K. (2020b) COVID-19 and Food Security in Ethiopia: Do Social Protection Programs Protect? IFPRI Discussion Paper.
- Adeniyi, D.A., Losch, B. & Adelle, C. (2021) Investigating the South African Food Insecurity Paradox: A Systematic Review of Food System Governance in South Africa. Food Security SA Working Paper Series. Working Paper 009.
- Africa, H.J., (2006) A Critical Evaluation of the “Fit for Future” Programme and The Change Management Process that were Implemented at Anglo Platinum Limited between 1996 and 2006. Unpublished Master of Business Administration Dissertation. Graduate School of Business, University of KwaZulu-Natal.
- Aggarwal, S., Jeong, D., Kumar, N., Robinson, J., Spearot, S. (2020) Did COVID-19 market disruptions disrupt food security? Evidence from households in rural Liberia and Malawi. Tech. rep., National Bureau of Economic Research.
- Aliyu, U.S.; Ozdeser, H.; Çavuşoğlu, B.; Usman, M.A.M. (2021) Food Security Sustainability: A Synthesis of the Current Concepts and Empirical Approaches for Meeting SDGs. *Sustainability* 13, 11728. <https://doi.org/10.3390/su132111728>
- Amare, M., Abay, K.A., Luca Tiberti L., Chamberlin, J. (2021) COVID-19 and food security: Panel data evidence from Nigeria. *Food Policy* 101
- Arndt, C., Davies, R., Gabriel, S., Harris, L., Makrelov, K., Robinson, S., Anderson, L. (2020) Covid-19 lockdowns, income distribution, and food security: An analysis for South Africa. *Global Food Security* 26.
- Altman, M., Hart, T. and Jacobs, P. (2009) Household Food Security in South Africa. *Agrekon*, Vol. 48, No. 4. P 349.
- Azeem, M.M., Mugeru, A.W., Schilizzi, S. (2016) Living on the edge: Household vulnerability to food-insecurity in the Punjab, Pakistan. *Food Policy*, 64, 1–13.

- Baiphethi, M., N. and Jacobs, P., T. (2009) The Contribution of Subsistence Farming to Food Security in South Africa. *Agrekon*, 48(4):473 – 475.
- Barrett, C.B. (2010) Measuring food insecurity. *Science*, 327, 825-828
- Berhane, G., Hoddinott, J., Kumar, N., and Taffesse, A. (2011) The impact of Ethiopia's productive safety nets and household asset building Programme: 2006–2010. Washington DC: International Food Policy Research Institute (IFPRI).
- Bastagli, F., Hagen-Zanker, J., Harman, L., Barca, V., Sturge, G., and Schmidt, T. (2016) Cash transfers: What does the evidence say? A rigorous review of programme impact and of the role of design and implementation features. London: Overseas Development Institute (ODI).
- Bogale, A., Shimelis, A. (2009) Household level determinants of food insecurity in rural areas of Dire Dawa, Eastern Ethiopia. *African Journal of Food, Agriculture, Nutrition and Development*. 9(9).
- Bourdieu, P. (1985) "He forms of capital". In: J.G.Richardson (ur.) *Handbook of Theory and Research for the Sociology of Education*. New York: Greendwood.
- Breisinger, C., Abdelatif, A., Raouf, M., Wiebelt, M. (2020) COVID-19 and the Egyptian economy: Estimating the impacts of expected reductions in tourism, Suez Canal revenues, and remittances. International Food Policy Research Institute (IFPRI): Regional Program Policy Note 06.
- Capaldo, J., Karfakis, P., Knowles, M. and Smulders, M. (2010) A model of vulnerability to food insecurity. ESA Working Paper No. 10-03
- Carney, D., Drinkwater, M., Rusinow, T., Neefjes, K., Wanmali, S., and Singh, N. (1999) Livelihoods approach compared. Department for International Development
- Chiwona-Karlton, L., Amuakwa-Mensah, F., Wamala-Larsson, C., Amuakwa-Mensah, S., Abu Hatab, A., Made, N., Taremwa, N. K., Melyoki, L., Rutashobya, L. K., Madonsela, T., Lourens, M., Stone, W., and Bizoza, A. R. (2021) COVID-19: From health crises to food security anxiety and policy implications. *Ambio*, 50(4), 794–811. <https://doi.org/10.1007/s13280-020-01481-y>
- Chaudhuri, S. (2003) *Assessing Vulnerability to Poverty: Concepts, Empirical Methods and Illustrative Examples*. Columbia University: New York, NY, USA, 2003.

Compton, J., Wiggins, S., & Keats, S. (2010) Impact of the global food crisis on the poor: What is the evidence? London: Overseas Development Institute

Coates, J., Frongillo, E. A., & Rogers, B. L. (2006) Commonalities in the Experience of Household Food Insecurity across Cultures: What are Measures Missing? *Journal of Nutrition* 136(5): 1438S-1448S . Implications for Food Security. *Agrekon* 2013, 52, 1–17.

Department of Social Development & Department of Agriculture Forestry and Fisheries. (2013) National Policy on Food and Nutrition Security, DSD, DAFF: Pretoria, South Africa.

Devereux, S., & Maxwell, S. (2001) *Food security in Sub-Saharan Africa*. Warwickshire: Practical Action

Devereux, S. 2006. The Impact of Droughts and Floods on Food Security and Policy Options to Alleviate Negative Effects. *Agricultural Economics*. 37(1), 47-58.

Devereux, S., Bene, C., & Hoddinott, J., 2020. Conceptualizing COVID-19's impacts on household food security. 12, 769–772.

Deitchler, M., Ballard T., Swindale, A. & Coates, J. (2011) Introducing a Simple Measure of Household Hunger for Cross-Cultural Use. USAID, Washington, DC. P5-6

Diao, X., Mahrt, K., (2020) Assessing the Impacts of COVID-19 in Myanmar on Household Incomes and Poverty Due to Declines in Remittances. Myanmar Strategy Support Programme Policy Note 06. International Food Policy Research Institute, Yangon.

Fawole, W.O., Ilbasimis, E., Ozkan, B., (2015) Food insecurity in Africa in terms of causes, effects and solutions: A case study of Nigeria. 2nd International Conference on Sustainable Agriculture and Environment, Selcuk University and Bahri Dagdas International Agricultural Research Institute Campus in the City of Konya: Turkey.

Food and Agricultural Organisation. (2006) Food security. Policy brief. https://www.fao.org/fileadmin/templates/faotaly/documents/pdf/pdf_Food_Security_Cocept_No te.pdf. Date of access: 14 June 2022

Food and Agricultural Organization (2009) The State of Food Insecurity in the World Economic crises – Impacts and lessons learned. Food And Agriculture Organisation of The United Nations, Rome:26 -27.

Food and Agriculture Organisation of the United Nations. (2017) The future of food and agriculture: Trends and challenges. Retrieved from <http://www.fao.org/3/a-i6583e.pdf>. Date of access:01 May 2022.

Food and Agriculture Organisation, (2020) Addressing the Impacts of COVID-19 in Food Crises April–December 2020. FAO's Component of the Global COVID-19 Humanitarian Response Plan. <https://doi.org/10.4060/ca8497en>. Date of access: 04 May 2022.

Goudge, J., Russel, S., Gilson, L., Gujmede, T., Tollman, S., & Mills, A. (2009) Illness-related impoverishment in rural South Africa: Why does social protection work for some households but not others? *Journal of International Development*, 21(2), 231–251. doi:10.1002/jid.1550.

Hadley, C., Linzer, D. A., Belachew, T., Mariam, A. G., Tessema, F., & Lindstrom, D. (2011) Household capacities, vulnerabilities and food insecurity: Shifts in food insecurity in urban and rural Ethiopia during the 2008 food crisis. *Social Science & Medicine*,73(10), 1534–1542. doi:10.1016/j.socscimed.2011.09.004.

Hart, G.B., Davids, Y.D., Rule S., Tirivanhu P., Mtyingizane, S. (2022) ‘The covid-19 pandemic reveals an unprecedented rise in hunger: The South African government was ill-prepared to meet the Challenge’, *Scientific African*, 16, 4-7. doi:10.1016/j.sciaf.2022.e01169.

Hirvonen, K., Mohammed, B., Minten, B., Tamru, S. (2021) Food marketing margins during the COVID-19 pandemic: Evidence from vegetables in Ethiopia. *Agricultural Economics*, 53(3), 363-542. <https://doi.org/10.1111/agec.12626>.

Hoddinott, J., & Wiesmann, D. (2010) *The impact of conditional cash transfer programmes on food consumption, conditional cash transfers in Latin America*. Baltimore: Johns Hopkins University Press.

Hussein, W., & Janekarnkij, P. (2013) Determinants of Rural Household Food Security in Jigjiga District of Ethiopia. *Kasetsart J. Soc. Sci.* 34: 171 – 180.

Ishiwatari M, Koike T, Hiroki K, Toda T, Katsube T. (2020) Managing disasters amid COVID-19 pandemic: Approaches of response to flood disasters. *Prog Disaster Sci.*, 6:100096. <https://doi.org/10.1016/j.pdisas.2020.100096>

International Trade Centre. (2010) South Africa: A Potential Market for Agri-food Products from Africa. International Trade Centre (ITC), Geneva. P1-2.

Kahn, K., Collinson, M. A., Gómez-Olivé, F. X., Mokoena, O., Twine, R., Mee, P. (2012) Profile: Agincourt health and socio-demographic surveillance system. *International Journal of Epidemiology*, 41, 988–1001.

Kaplan, R.S. & Norton, D.P. (2006) *Alignment: Using the Balanced Scorecard to Create Corporate Synergies*. Boston: Harvard Business School Publishing Corporation.

Karyn H., and Mo Salman (2011) Food security: its components and challenges. *Int. J. Food Safety, Nutrition, and Public Health*, Vol. 4, No. 1, 2011

Kirkland, T. M., Kemp, R. J., Hunter, L. M., & Twine, W. (2013) Toward an improved understanding of food security: a methodological examination based in rural South Africa. *Food Culture & Society*, 16(1),65–84.

Koch, J. (2011) The Food Security Policy Context in South Africa. United Nations International Policy Centre for Inclusive Growth: Brasilia, Brazil.

Leedy, P.D., & Ormond, J.E. 2001. *Practical Research: Planning and Design*. Merrill Prentice Hall, New Jersey.

Lipton, M., & Saghai, Y. (2017) Food security, farmland access ethics, and land reform. *Global Food Security*, 12, 59-66. <https://doi.org/10.1016/J.GFS.2016.03.004>.

Lokosang, L.B.; Ramroop, S.; Hendriks, S.L. (2011) Establishing a robust technique for monitoring and early warning of food insecurity in post-conflict Southern Sudan using Ordinal Logistic Regression. *Agrekon*, 50: 101–130.

Long, H. (2014) An Empirical Review of Research Methodologies and Methods in Creativity Studies (2003–2012). *Creativity Research Journal*, 26:4,427-438, DOI:10.1080/10400419.2014.961781

- Mahajan, K., Tomar, S., (2021) COVID-19 and Supply Chain Disruption: Evidence from Food Markets in India. *Am. J. Agricult. Econ.* 103 (1), 35–52.
- Manley, J., Gitter, S., & Slavchevska, V. (2012) How effective are cash transfer programmes at improving nutritional status? A rapid evidence assessment of programmes' effects on anthropometric outcomes. London: EPPI-Centre, Social Science Research Unit, Institute of Education, University of London.
- May, J. and Carter, M. (2009). Agriculture: Analysis of the NIDS Wave 1 Dataset. Discussion paper no.6. University of Cape Town: National Income Dynamics Study (NIDS):1-3.
- Mbajjorgu, G. (2020) Human Development and Food Sovereignty: A Step Closer to Achieving Food Security in South Africa's Rural Households. *Journal of Asian and African Studies*, 55(3), 330–350. <https://doi.org/10.1177/0021909619875757>.
- Miller, C., Tsoka, M., & Reichert, K. (2011) Impacts on children of cash transfers in Malawi, Chapter 6 in Handa, S., Devereux, S and Webb, D. (editors). In *Social protection for Africa's children*. London: Routledge.
- Missemer, A. (2018) Natural Capital as an Economic Concept, History and Contemporary Issues. *Ecological Economics*, 143:90-96. 10.1016/j.ecolecon.2017.07.011
- Mthethwa, S.; Wale, E. (2020) Household Vulnerability to Food Insecurity in Rural South Africa: Evidence from a Nationally Representative Survey Data. *Int. J. Environ. Res. Public Health* 18, 1917. <https://doi.org/10.3390/ijerph18041917>
- Nawtrozki, R.J., Robson, K., Gutilla, M.J., Hunter, L.M., Twine, W., Nurland, P. (2014) Exploring the impact of the 2008 global food crisis on food security among vulnerable households in rural South Africa. *Food Sec.*, 6,283-297
- Nunamaker, J.F., Jr. and Chen, M. (1990) Systems Development in Information Systems Research. Proceedings of the Twenty-Third Annual Hawaii International Conference on. Conference Publications Vol (3): 631 – 640.
- Obi, C., Bartolini, F. & D'Haese, M. (2020) International migration, remittance and food security during food crises: the case study of Nigeria. *Food Sec.*, 12, 207–220. <https://doi.org/10.1007/s12571-019-00990-3>

- Patrick, H.O., Khalema, E.N., Abiolu, O.A., Ijatuyi, E.J., Abiolu, R.T. (2021) ‘South Africa’s multiple vulnerabilities, food security and livelihood options in the COVID-19 new order: An annotation’, *The Journal for Transdisciplinary Research in Southern Africa*, 17(1), 4–10. doi:10.4102/td.v17i1.1037.
- Patel, L., & Hochfeld, T. (2011) It buys food but does it change gender relations? Child support grants in Soweto, South Africa. *Gender and Development*, 19(2), 229–240.
- Sakyi. P., (2012) Determinants of food accessibility of rural households in the Limpopo province, South Africa. Master of Science in nutrition and rural development. Ghent University, Faculty of Bioscience Engineering.
- Seidenfeld, D., Handa, S., Tembo, S., Michelo, S., Harland Scott, C., &Prencipe, L. (2014) The impact of an unconditional cash transfer on food security and nutrition: The Zambia child Grant Programme (pp. 36–42). IDS Special Collection, September
- Schatz, E., Gomez-Olive, X., Ralston, M., Menken, J., & Tollman, S. (2012) The impact of pensions on health and wellbeing in rural South Africa: does gender matter? *Social Science & Medicine*, 75(10), 1864–1873. doi:10.1016/j.socscimed.2012.07.004. Sen, A. (1983).
- Shackleton, C., & Shackleton, S. (2004) The importance of non-timber forest products in rural livelihood security and as safety nets: A review of evidence from South Africa. *South African Journal of Science*, 100(11–12), 658–664.
- Shackleton, C., & Shackleton, S. (2011) Exploring the role of wild natural resources in poverty alleviation. In P. Hebinck & C.Shackleton (Eds.), *Reforming land and resource use in South Africa: Impact on livelihoods*. New York: Routledge.
- Shifa, M., David, A., Leibbrandt, M. (2020) Inequality through the prism of the pandemic. The African Centre of Excellence for Inequality Research (ACEI); Working Paper.
- StatsSA Statistics South Africa (StatsSA). (2019) Towards measuring food security in South Africa: An examination of hunger and food inadequacy. Report No. 03-00-14. Pretoria: Statistics South Africa. <http://www.statssa.gov.za/?p=12135>. Date of access: 01 May 2022.

- Statistics South Africa (StatsSA. (2020) *General Household Survey 2019*. Accessed from. <https://www.statssa.gov.za/publications/P0318/P03182019.pdf>. Date of access: 17 May 2022
- Statistics South Africa, (2022). *Measuring Food Security in South Africa: Applying the Food Insecurity Experience Scale*. Accessed from. <http://www.statssa.gov.za/publications/Report-03-00-19/Report-03-00-192020.pdf>. Date of access: 03 June 2022
- Striteska, M. and Spickova, M. (2012) Review and Comparison of Performance Measurement Systems. *Journal of Organisational Management Studies*. [ejournal] 2012:13. Accessed from. <http://dx.doi.org/10.5171/2012.114900>. Date of access: 12 May 2022
- Tibesigwa, B., Visser, M., Collinson, M. & Twine, W. (2016) Investigating the sensitivity of household food security to agriculture-related shocks and the implication of social and natural capital. *Sustainability Science*, 11:193-214.
- Torero, M. 2020. Without food, there can be no exit from the pandemic. *Nature*, 580: 588–589. <https://doi.org/10.1038/d41586-020-01181-3>
- van der Berg, S., Patel, L., Bridgman, G. 2022. Food insecurity in South Africa: Evidence from NIDS-CRAM wave 5. *Development Southern Africa*, 39:5722-737, DOI: 10.1080/0376835X.2022.2062299.
- Van Biljon, E.H.B. 1999. Supplier Network Re-Engineering by Automotive Assemblers in the Eastern Cape. Unpublished Doctoral of Commerce Thesis. University of Port Elizabeth.
- Van Wyk, R.B., Dlamini, C.S., (2018) The impact of food prices on the welfare of households in South Africa. *S. Afr. J. Econ. Management. Sci.* 21 (1).
- Vanlauwe, B.; Bationo, A.; Chianu, J.; Giller, K.E.; Merckx, R.; Mkwunye, U.; Ohiokpehai, O.; Pypers, P.; Tabo, R.; Shepherd, K.D. (2010) Integrated soil fertility management: Operational definition and consequences for implementation and dissemination. *Outlook Agric.* 39:17–24.
- Venning, M. (2021) Promoting Food Security During the COVID-19 Pandemic: Community Resilience and Adaptation in Limpopo Province, South Africa. Department of Health Promotion and Development. Faculty of Psychology. University of Bergen.

- Vinz, S. (2022) What Is a Theoretical Framework? Guide to Organising. Accessed from: <https://www.scribbr.com/dissertation/theoretical-framework/> Date of access: 25 January 2023.
- von Braun, J., Algieri, B., Kalkuhl, M. (2014) World Food System Disruptions in the Early 2000s: Causes, Impacts, and Cures. *World Food Policy* 1 (1), 1–22.
- Waidler, J., Devereux, S. (2019) Social grants, remittances, and food security: Does the source of income matter? *Food Security*, 11:679–702
- Wieser, C., Ambel, A.A., Bundervoet, T., Haile, A. (2020) Monitoring COVID-19 Impacts on Households in Ethiopia: Results from a High-Frequency Phone Survey of Households. World Bank, Washington, DC.
- Wills, G, Patel, L, Van der Berg, S & Mpeta, B. (2020) Household resource flows and food poverty during South Africa’s lockdown: Short-term policy implications for three channels of social protection. NIDS-CRAM Working Paper 12.
- World Bank. (2020a) *The impact of COVID-19 (Coronavirus) on global poverty: Why Sub-Saharan Africa might be the region hardest hit*. Data Blog.
- World Food Programme. (2005) *Emergency Food Security Assessment Handbook*. United Nations World Food Programme (WFP). Emergency Needs Assessment Branch (ODAN).
- World Health Organisation, (2020) *Coronavirus Disease (COVID-19): Situation Report-139*. Accessed from. <https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200607-covid-19-sitrep-139.pdf>. Date of access: 20 June 2022.
- World Food Programme. (2019) *Energy for food security*. Accessed from. <https://www.wfp.org/publications/energy-food-security>. Date of access: 15 January 2023.

APPENDICES

Appendix A: Stata Output tables

Table 1: Logit regression

food_security	Coefficient	Std. err.	z	P> z	[95% conf. interval]
hh_sex female	-.0702629	.0467593	-1.50	0.133	-.1619093 .0213836
hh_age	.0213115	.0020693	10.30	0.000	.0172558 .0253672
hh_educ					
2 Primary Education	.1759718	.0662597	2.66	0.008	.0461052 .3058384
3 Secondary Educatio	.599396	.0729185	8.22	0.000	.4564784 .7423135
4 Tertiary Education	.9294418	.1594851	5.83	0.000	.6168568 1.242027
hh_econact	.0060727	.0391335	0.16	0.877	-.0706277 .082773
lnhh_income	.5492182	.0392256	14.00	0.000	.4723374 .626099
lnremm	-.0623	.0076367	-8.16	0.000	-.0772676 -.0473324
covid_grant	-.0007264	.0023414	-0.31	0.756	-.0053155 .0038627
income_agrigoods	.169018	.3545975	0.48	0.634	-.5259804 .8640164
add_hhincome	.3121655	.3569258	0.87	0.382	-.3873961 1.011727
water_acc	.0049004	.0055592	0.88	0.378	-.0059953 .0157961
hh_grownfood source of food	.1684499	.1349566	1.25	0.212	-.0960602 .4329601
veh_ownership	.6750437	.1011692	6.67	0.000	.4767557 .8733316
l_stock_ownership	-.0955928	.0597407	-1.60	0.110	-.2126824 .0214968
social_relsh	.0516318	.0158868	3.25	0.001	.0204942 .0827694
hh_disab	-.1042214	.0359847	-2.90	0.004	-.1747501 -.0336928
hh_covidstat	-.1641854	.0494839	-3.32	0.001	-.261172 -.0671988
hh_grantrep	-.0888727	.0156717	-5.67	0.000	-.1195886 -.0581568
_cons	-2.872415	.3298011	-8.71	0.000	-3.518814 -2.226017

Table 2: Odds ratio regression results

food_security	Odds ratio	Std. err.	z	P> z	[95% conf. interval]
hh_sex female	.9321488	.0435866	-1.50	0.133	.8505183 1.021614
hh_age	1.02154	.0021139	10.30	0.000	1.017406 1.025692
hh_educ					
2 Primary Education	1.192404	.0790083	2.66	0.008	1.047185 1.357763
3 Secondary Educatio	1.821019	.1327859	8.22	0.000	1.578505 2.10079
4 Tertiary Education	2.533095	.4039909	5.83	0.000	1.853094 3.462625
hh_econact	1.006091	.0393719	0.16	0.877	.9318088 1.086295
lnhh_income	1.731899	.0679348	14.00	0.000	1.603738 1.8703
lnremm	.9396009	.0071754	-8.16	0.000	.9256421 .9537703
covid_grant	.9992739	.0023397	-0.31	0.756	.9946986 1.00387
income_agrigoods	1.184141	.4198937	0.48	0.634	.5909757 2.372671
add_hhincome	1.366381	.4876965	0.87	0.382	.6788221 2.750347
water_acc	1.004912	.0055865	0.88	0.378	.9940226 1.015922
hh_grownfood source of food	1.183469	.159717	1.25	0.212	.9084093 1.541815
veh_ownership	1.964119	.1987083	6.67	0.000	1.61084 2.394876
l_stock_ownership	.908834	.0542944	-1.60	0.110	.8084128 1.02173
social_relsh	1.052988	.0167286	3.25	0.001	1.020706 1.086291
hh_disab	.9010258	.0324231	-2.90	0.004	.8396668 .9668685
hh_covidstat	.8485847	.0419913	-3.32	0.001	.7701484 .9350093
hh_grantrep	.914962	.014339	-5.67	0.000	.8872854 .943502
_cons	.0565621	.0186543	-8.71	0.000	.0296346 .1079576

Table 3: Coefficient significance regression

	Food Security
hh_sex female	-0.0703
hh_age	0.0213***
hh_educ	
2 Primary Education	0.176**
3 Secondary Educatio	0.599***
4 Tertiary Education	0.929***
hh_econact	0.00607
lnhh_income	0.549***
lnremm	-0.0623***
covid_grant	-0.000726
income_agrigoods	0.169
add_hhincome	0.312
water_acc	0.00490
hh_grownfood source of food	0.168
veh_ownership	0.675***
l_stock_ownership	-0.0956
social_relsh	0.0516**
hh_disab	-0.104**
hh_covidstat	-0.164***
hh_grantrep	-0.0889***
_cons	-2.872***
N 15368 * p<0.05, ** p<0.01, *** p<0.001	

Table 4: Marginal effect for females who obtained higher education

Expression: Pr(food_security), predict()

1._at: hh_sex = 0

hh_age = 15

hh_educ = 4

2._at: hh_sex = 0

hh_age = 25

hh_educ = 4

3._at: hh_sex = 0

hh_age = 35

hh_educ = 4

4._at: hh_sex = 0

hh_age = 45

hh_educ = 4

5._at: hh_sex = 0

hh_age = 55

hh_educ = 4

6._at: hh_sex = 0

hh_age = 65

hh_educ = 4

	Margin	std. err.	z	P> z	[95% conf. interval]
_at					

1	.7738513	.0257979	30.00	0.000	.7232884	.8244141
2	.8069182	.022115	36.49	0.000	.7635735	.8502629
3	.8363867	.0190003	44.02	0.000	.7991467	.8736267
4	.8623018	.0164317	52.48	0.000	.8300963	.8945072
5	.8848184	.0143383	61.71	0.000	.8567158	.9129211
6	.9041718	.0126251	71.62	0.000	.8794271	.9289166

Table 4: Marginal effect for males who obtained higher education

Expression: Pr(food_security), predict()

1. _at: hh_sex = 1

hh_age = 15

hh_educ = 4

2. _at: hh_sex = 1

hh_age = 25

hh_educ = 4

3. _at: hh_sex = 1

hh_age = 35

hh_educ = 4

4. _at: hh_sex = 1

hh_age = 45

hh_educ = 4

5. _at: hh_sex = 1

hh_age = 55

hh_educ = 4

6._at: hh_sex = 1

hh_age = 65

hh_educ = 4

	Margin	std. err.	z	P> z	[95% conf. interval]	
_at						
1	.7851483	.0251167	31.26	0.000	.7359205	.834376
2	.8170318	.0215323	37.94	0.000	.7748293	.8592343
3	.8453178	.0185114	45.66	0.000	.8090361	.8815995
4	.8700907	.0160197	54.31	0.000	.8386928	.9014887
5	.8915354	.0139812	63.77	0.000	.8641327	.9189382
6	.9099069	.0123023	73.96	0.000	.8857948	.934019

Table 5: Marginal effect for females who obtained secondary education.

Expression: Pr(food_security), predict()

1._at: hh_sex = 0

hh_age = 15

hh_educ = 3

2._at: hh_sex = 0

hh_age = 25

hh_educ = 3

3._at: hh_sex = 0

hh_age = 35

hh_educ = 3

4._at: hh_sex = 0

hh_age = 45

hh_educ = 3

5._at: hh_sex = 0

hh_age = 55

hh_educ = 3

6._at: hh_sex = 0

hh_age = 65

hh_educ = 3

	Margin	std. err.	z	P> z	[95% conf. interval]
_at					
1	.7158025	.0152659	46.89	0.000	.6858818 .7457232
2	.7542063	.0110059	68.53	0.000	.7326352 .7757774
3	.7892184	.0076542	103.11	0.000	.7742164 .8042203
4	.8206639	.0055899	146.81	0.000	.8097079 .8316198
5	.8485158	.0050367	168.47	0.000	.8386439 .8583876
6	.8728723	.0054673	159.65	0.000	.8621565 .8835881

Table 6: Marginal effect for males who obtained secondary education

Expression: Pr(food_security), predict()

1._at: hh_sex = 1

hh_age = 15

hh_educ = 3

2._at: hh_sex = 1

hh_age = 25

hh_educ = 3

3._at: hh_sex = 1

hh_age = 35

hh_educ = 3

4._at: hh_sex = 1

hh_age = 45

hh_educ = 3

5._at: hh_sex = 1

hh_age = 55

hh_educ = 3

6._at: hh_sex = 1

hh_age = 65

hh_educ = 3

	Margin	std. err.	z	P> z	[95% conf. interval]
_at					
1	.7288215	.0145673	50.03	0.000	.7002702 .7573728

2	.7661361	.0105667	72.51	0.000	.7454259	.7868464
3	.799984	.0075557	105.88	0.000	.7851751	.814793
4	.830241	.0058488	141.95	0.000	.8187776	.8417045
5	.8569244	.0054678	156.72	0.000	.8462077	.867641
6	.8801674	.0058352	150.84	0.000	.8687306	.8916042

Table 7: Marginal effect for females who obtained Primary education

Expression: Pr(food_security), predict()

1._at: hh_sex = 0

hh_age = 15

hh_educ = 2

2._at: hh_sex = 0

hh_age = 25

hh_educ = 2

3._at: hh_sex = 0

hh_age = 35

hh_educ = 2

4._at: hh_sex = 0

hh_age = 45

hh_educ = 2

5._at: hh_sex = 0

hh_age = 55

hh_educ = 2

6._at: hh_sex = 0

hh_age = 65

hh_educ = 2

	Margin	std. err.	z	P> z	[95% conf. interval]
_at					
1	.6309104	.020993	30.05	0.000	.5897648 .672056
2	.6749056	.0162172	41.62	0.000	.6431204 .7066908
3	.7163289	.0119633	59.88	0.000	.6928812 .7397766
4	.7546899	.0086109	87.64	0.000	.7378129 .7715669
5	.7896558	.0066167	119.34	0.000	.7766874 .8026242
6	.8210539	.0061827	132.80	0.000	.8089359 .8331718

Table 8: Marginal effect for males who obtained Primary education

Expression: Pr(food_security), predict()

1._at: hh_sex = 1

hh_age = 15

hh_educ = 2

2._at: hh_sex = 1

hh_age = 25

hh_educ = 2

3._at: hh_sex = 1

hh_age = 35

hh_educ = 2

4._at: hh_sex = 1

hh_age = 45

hh_educ = 2

5._at: hh_sex = 1

hh_age = 55

hh_educ = 2

6._at: hh_sex = 1

hh_age = 65

hh_educ = 2

	Margin	std. err.	z	P> z	[95% conf. interval]
_at					
1	.6456633	.0201531	32.04	0.000	.606164 .6851626
2	.6888739	.0155193	44.39	0.000	.6584566 .7192912
3	.7293343	.0115083	63.37	0.000	.7067785 .7518902
4	.7666048	.008496	90.23	0.000	.749953 .7832566
5	.8004059	.0068612	116.66	0.000	.7869582 .8138536
6	.8306154	.006602	125.81	0.000	.8176757 .8435552

Table 9: Marginal effect for females led household that had a members who tested positive for Covid-19

Expression: Pr(food_security), predict()

1._at: hh_sex = 0

hh_age = 15

hh_covidstat = 1

2._at: hh_sex = 0

hh_age = 25

hh_covidstat = 1

3._at: hh_sex = 0

hh_age = 35

hh_covidstat = 1

4._at: hh_sex = 0

hh_age = 45

hh_covidstat = 1

5._at: hh_sex = 0

hh_age = 55

hh_covidstat = 1

6._at: hh_sex = 0

hh_age = 65

hh_covidstat = 1

	Margin	std. err.	z	P> z	[95% conf. interval]
_at					
1	.6373705	.0207733	30.68	0.000	.5966557 .6780854
2	.6802681	.0165014	41.22	0.000	.647926 .7126102
3	.720698	.012792	56.34	0.000	.6956262 .7457698
4	.7581887	.0099777	75.99	0.000	.7386329 .7777446
5	.7924148	.0083327	95.10	0.000	.776083 .8087467
6	.8232008	.007829	105.15	0.000	.8078563 .8385453

Table 10: Marginal effect for females led household that had a members who tested negative for Covid-19

Expression: Pr(food_security), predict()

1._at: hh_sex = 0

hh_age = 15

hh_covidstat = 0
 2._at: hh_sex = 0
 hh_age = 25
 hh_covidstat = 0
 3._at: hh_sex = 0
 hh_age = 35
 hh_covidstat = 0
 4._at: hh_sex = 0
 hh_age = 45
 hh_covidstat = 0
 5._at: hh_sex = 0
 hh_age = 55
 hh_covidstat = 0
 6._at: hh_sex = 0
 hh_age = 65
 hh_covidstat = 0

	Margin	std. err.	z	P> z	[95% conf. interval]
_at					
1	.6706175	.017509	38.30	0.000	.6363004 .7049346
2	.7116607	.0128717	55.29	0.000	.6864325 .7368889
3	.7498605	.0087953	85.26	0.000	.732622 .767099
4	.784857	.0056373	139.23	0.000	.7738082 .7959058
5	.8164407	.0040349	202.35	0.000	.8085325 .8243489
6	.8445457	.0042991	196.44	0.000	.8361195 .8529718

Table 11: Marginal effect for male led household that had a members who tested positive for Covid-19

Expression: Pr(food_security), predict()

1. _at: hh_sex = 1

hh_age = 15

hh_covidstat = 1

2. _at: hh_sex = 1

hh_age = 25

hh_covidstat = 1

3. _at: hh_sex = 1

hh_age = 35

hh_covidstat = 1

4. _at: hh_sex = 1

hh_age = 45

hh_covidstat = 1

5. _at: hh_sex = 1

hh_age = 55

hh_covidstat = 1

6. _at: hh_sex = 1

hh_age = 65

hh_covidstat = 1

	Margin	std. err.	z	P> z	[95% conf. interval]
_at					

1	.6517518	.0202082	32.25	0.000	.6121444	.6913592
2	.6938962	.0160912	43.12	0.000	.6623582	.7254343
3	.7334023	.0126157	58.13	0.000	.708676	.7581286
4	.7698452	.01008	76.37	0.000	.7500888	.7896017
5	.8029494	.0086666	92.65	0.000	.7859632	.8199356
6	.832587	.0082419	101.02	0.000	.8164332	.8487408

Table 12: Marginal effect for male-led household that had a members who tested negative for Covid-19

Expression: Pr(food_security), predict()

1. _at: hh_sex = 1

hh_age = 15

hh_covidstat = 0

2. _at: hh_sex = 1

hh_age = 25

hh_covidstat = 0

3. _at: hh_sex = 1

hh_age = 35

hh_covidstat = 0

4. _at: hh_sex = 1

hh_age = 45

hh_covidstat = 0

5. _at: hh_sex = 1

hh_age = 55

hh_covidstat = 0

6._at: hh_sex = 1

hh_age = 65

hh_covidstat = 0

	Margin	std. err.	z	P> z	[95% conf. interval]
_at					
1	.6844352	.0168788	40.55	0.000	.6513534 .717517
2	.7245898	.0124507	58.20	0.000	.7001869 .7489927
3	.7617659	.0087009	87.55	0.000	.7447124 .7788194
4	.7956531	.0060092	132.41	0.000	.7838753 .807431
5	.8260906	.0048454	170.49	0.000	.8165937 .8355875
6	.8530562	.0050998	167.27	0.000	.8430607 .8630517

Table 13: Marginal effect for female-led household that had a member receiving the social relief of distress.

Expression: Pr(food_security), predict()

1._at: hh_sex = 0

hh_age = 15

covid_grant = 1

2._at: hh_sex = 0

hh_age = 25

covid_grant = 1

3._at: hh_sex = 0

hh_age = 35

covid_grant = 1

4._at: hh_sex = 0

hh_age = 45

covid_grant = 1

5._at: hh_sex = 0

hh_age = 55

covid_grant = 1

6._at: hh_sex = 0

hh_age = 65

covid_grant = 1

	Margin	std. err.	z	P> z	[95% conf. interval]
_at					
1	.6721061	.0207677	32.36	0.000	.6314021 .7128101
2	.7130429	.0164872	43.25	0.000	.6807287 .7453572
3	.7511233	.0128354	58.52	0.000	.7259664 .7762803
4	.7859931	.0100695	78.06	0.000	.7662573 .8057289
5	.817448	.0083642	97.73	0.000	.8010545 .8338415
6	.8454268	.0076535	110.46	0.000	.8304263 .8604273

Table 14: Marginal effect for female-led household that had no member receiving the social relief of distress.

Expression: Pr(food_security), predict()

1._at: hh_sex = 0

hh_age = 15

covid_grant = 0

2._at: hh_sex = 0

hh_age = 25
 covid_grant = 0
 3._at: hh_sex = 0
 hh_age = 35
 covid_grant = 0
 4._at: hh_sex = 0
 hh_age = 45
 covid_grant = 0
 5._at: hh_sex = 0
 hh_age = 55
 covid_grant = 0
 6._at: hh_sex = 0
 hh_age = 65
 covid_grant = 0

	Margin	std. err.	z	P> z	[95% conf. interval]
_at					
1	.67225	.0210191	31.98	0.000	.6310533 .7134467
2	.7131778	.0167602	42.55	0.000	.6803285 .7460272
3	.7512478	.013128	57.22	0.000	.7255173 .7769783
4	.7861062	.0103709	75.80	0.000	.7657795 .8064328
5	.8175493	.008649	94.53	0.000	.8005976 .834501
6	.8455162	.0078913	107.15	0.000	.8300495 .860983

Table 15: Marginal effect for male-led household that had a member receiving the social relief of distress.

Expression: Pr(food_security), predict()

1._at: hh_sex = 1

hh_age = 15

covid_grant = 1

2._at: hh_sex = 1

hh_age = 25

covid_grant = 1

3._at: hh_sex = 1

hh_age = 35

covid_grant = 1

4._at: hh_sex = 1

hh_age = 45

covid_grant = 1

5._at: hh_sex = 1

hh_age = 55

covid_grant = 1

6._at: hh_sex = 1

hh_age = 65

covid_grant = 1

	Margin	std. err.	z	P> z	[95% conf. interval]
_at					
1	.6858905	.0200382	34.23	0.000	.6466164 .7251647
2	.7259339	.0159098	45.63	0.000	.6947512 .7571166

3	.7629875	.0124715	61.18	0.000	.7385439	.7874312
4	.7967467	.0099486	80.09	0.000	.7772479	.8162455
5	.8270558	.00845	97.88	0.000	.8104941	.8436174
6	.853897	.0078361	108.97	0.000	.8385385	.8692555

Table 16: Marginal effect for male-led household that had no member receiving the social relief of distress.

Expression: Pr(food_security), predict()

1. _at: hh_sex = 1

hh_age = 15

covid_grant = 0

2. _at: hh_sex = 1

hh_age = 25

covid_grant = 0

3. _at: hh_sex = 1

hh_age = 35

covid_grant = 0

4. _at: hh_sex = 1

hh_age = 45

covid_grant = 0

5. _at: hh_sex = 1

hh_age = 55

covid_grant = 0

6. _at: hh_sex = 1

hh_age = 65

covid_grant = 0

	Margin	std. err.	z	P> z	[95% conf. interval]
_at					
1	.6860316	.0202848	33.82	0.000	.6462742 .7257891
2	.7260655	.0161747	44.89	0.000	.6943635 .7577674
3	.7631083	.0127506	59.85	0.000	.7381177 .788099
4	.7968559	.0102286	77.90	0.000	.7768083 .8169036
5	.8271531	.0087063	95.01	0.000	.810089 .8442172
6	.8539826	.0080454	106.15	0.000	.838214 .8697513

Table 17: Marginal effect for female-led household that uses agricultural goods they grow as a source of food.

Expression: Pr(food_security), predict()

1. _at: hh_sex = 0

hh_age = 15

hh_grownfood = 1

2. _at: hh_sex = 0

hh_age = 25

hh_grownfood = 1

3. _at: hh_sex = 0

hh_age = 35

hh_grownfood = 1

4. _at: hh_sex = 0

hh_age = 45

hh_grownfood = 1

5._at: hh_sex = 0

hh_age = 55

hh_grownfood = 1

6._at: hh_sex = 0

hh_age = 65

hh_grownfood = 1

	Margin	std. err.	z	P> z	[95% conf. interval]
_at					
1	.6571224	.0186462	35.24	0.000	.6205765 .6936684
2	.6990431	.0140563	49.73	0.000	.6714932 .726593
3	.7382445	.0100292	73.61	0.000	.7185877 .7579014
4	.7743207	.0069356	111.64	0.000	.7607271 .7879142
5	.8070166	.0052817	152.79	0.000	.7966647 .8173686
6	.8362256	.0052332	159.79	0.000	.8259688 .8464824

Table 18: Marginal effect for female-led household that uses agricultural goods they grow as a source of income.

Expression: Pr(food_security), predict()

1._at: hh_sex = 0

hh_age = 15

hh_grownfood = 2

2._at: hh_sex = 0

hh_age = 25

hh_grownfood = 2

3. `_at: hh_sex = 0`
`hh_age = 35`
`hh_grownfood = 2`

4. `_at: hh_sex = 0`
`hh_age = 45`
`hh_grownfood = 2`

5. `_at: hh_sex = 0`
`hh_age = 55`
`hh_grownfood = 2`

6. `_at: hh_sex = 0`
`hh_age = 65`
`hh_grownfood = 2`

	Margin	std. err.	z	P> z	[95% conf. interval]
<code>_at</code>					
1	.6224185	.033511	18.57	0.000	.5567381 .6880988
2	.6661084	.0299609	22.23	0.000	.6073861 .7248308
3	.7075	.0266452	26.55	0.000	.6552763 .7597238
4	.7460751	.0237025	31.48	0.000	.6996191 .7925311
5	.7814589	.0211982	36.86	0.000	.7399111 .8230066
6	.8134281	.0191213	42.54	0.000	.7759511 .8509051

Table 19: Marginal effect for male-led household that uses agricultural goods they grow as a source of food.

Expression: `Pr(food_security), predict()`

1. `_at: hh_sex = 1`

hh_age = 15

hh_grownfood = 1

2._at: hh_sex = 1

hh_age = 25

hh_grownfood = 1

3._at: hh_sex = 1

hh_age = 35

hh_grownfood = 1

4._at: hh_sex = 1

hh_age = 45

hh_grownfood = 1

5._at: hh_sex = 1

hh_age = 55

hh_grownfood = 1

6._at: hh_sex = 1

hh_age = 65

hh_grownfood = 1

	Margin	std. err.	z	P> z	[95% conf. interval]
_at					
1	.671213	.0180698	37.15	0.000	.6357967 .7066292
2	.712291	.0136788	52.07	0.000	.6854811 .7391009
3	.7504996	.0099582	75.36	0.000	.7309818 .7700174
4	.785482	.0072717	108.02	0.000	.7712297 .7997343
5	.8170332	.0059783	136.67	0.000	.805316 .8287504

6	.8450924	.0059709	141.54	0.000	.8333898	.8567951
---	----------	----------	--------	-------	----------	----------

Table 20: Marginal effect for male-led household that uses agricultural goods they grow as a source of income.

Expression: Pr(food_security), predict()

1._at: hh_sex = 1

hh_age = 15

hh_grownfood = 2

2._at: hh_sex = 1

hh_age = 25

hh_grownfood = 2

3._at: hh_sex = 1

hh_age = 35

hh_grownfood = 2

4._at: hh_sex = 1

hh_age = 45

hh_grownfood = 2

5._at: hh_sex = 1

hh_age = 55

hh_grownfood = 2

6._at: hh_sex = 1

hh_age = 65

hh_grownfood = 2

	Margin	std. err.	z	P> z	[95% conf. interval]
_at					
1	.6370396	.0328219	19.41	0.000	.5727099 .7013693
2	.6800371	.0292749	23.23	0.000	.6226593 .7374149
3	.7205507	.0260017	27.71	0.000	.6695884 .771513
4	.7581076	.0231227	32.79	0.000	.7127879 .8034273
5	.7923829	.0206845	38.31	0.000	.7518419 .8329238
6	.8232027	.0186608	44.11	0.000	.7866282 .8597773

APPENDIX B: Ethical Clearance



15-11-2022

Miss Nonhlanhla Violet Hlope (222049005)

School Of Acc Economics&Fin

Westville

Dear Miss Nonhlanhla Violet Hlope,

Original application number: 00019903

Project title: Household vulnerability to food insecurity during the Covid-19 pandemic: A case of rural South Africa

Exemption from Ethics Review

In response to your application received on 08 November 2022, your school has indicated that the protocol has been granted **EXEMPTION FROM ETHICS REVIEW**.

Any alteration/s to the exempted research protocol, e.g., Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through an amendment/modification prior to its implementation. The original exemption number must be cited.

For any changes that could result in potential risk, an ethics application including the proposed amendments must be submitted to the relevant UKZN Research Ethics Committee. The original exemption number must be cited.

In case you have further queries, please quote the above reference number.

PLEASE NOTE:

Research data should be securely stored in the discipline/department for a period of 5 years.

I take this opportunity of wishing you everything of the best with your study.

Yours sincerely,



Prof Josue Mbonigaba
Academic Leader Research
School Of Acc Economics&Fin

UKZN Research Ethics Office
Westville Campus, Govan Mbeki Building
Postal Address: Private Bag X54001, Durban 4000

Appendix C: Editors Letter



Office: 0183892451

FACULTY OF EDUCATION

Cell: [REDACTED]

Date: 28 June, 2023

TO WHOM IT MAY CONCERN

CERTIFICATE OF EDITING

I, Muchativugwa Liberty Hove, confirm and certify that I have read and edited the entire dissertation, **HOUSEHOLD VULNERABILITY TO FOOD INSECURITY DURING THE COVID-19 PANDEMIC: A CASE OF RURAL SOUTH AFRICA**, submitted by Nonhlanhla Violet Hlope, student number 222049005, in partial fulfilment of requirements for the degree of **Master of Commerce in Economics, School of Accounting, Economics and Finance College of Law and Management Studies, University of KwaZulu-Natal**

Nonhlanhla Violet Hlope was supervised by **Professor Gerry Bokan**

I hold a PhD in English Language and Literature in English and am qualified to edit such a research-based proposal for cohesion and coherence. The views expressed herein, however, remain those of the researcher/s.

Yours sincerely



Professor M.L. Hove (PhD, MA, PGDE, PGCE, BA Honours – English)



Appendix D: Turnitin report

Submission date: 09-Feb-2023 02:46AM (UTC+0200)

Submission ID: 2009696687

File name: 2023_Nonhlanhla_-_Final_dissertation_turnitin.docx (603.66K)

Word count: 20720

Character count: 113330

Mcom

ORIGINALITY REPORT

14%	12%	6%	5%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	Submitted to University of KwaZulu-Natal Student Paper	3%
2	researchspace.ukzn.ac.za Internet Source	1%
3	www.stata.com Internet Source	1%
4	www.researchgate.net Internet Source	<1%
5	documents1.worldbank.org Internet Source	<1%
6	hdl.handle.net Internet Source	<1%
7	vital.seals.ac.za:8080 Internet Source	<1%
8	Submitted to University of South Africa Student Paper	<1%
9	scholar.sun.ac.za Internet Source	<1%

10	lib.ugent.be Internet Source	<1 %
11	dspace.nwu.ac.za Internet Source	<1 %
12	Raphael J. Nawrotzki, Kristin Robson, Margaret J. Gutilla, Lori M. Hunter et al. "Exploring the impact of the 2008 global food crisis on food security among vulnerable households in rural South Africa", 'Springer Science and Business Media LLC' Internet Source	<1 %
13	encyclopedia.pub Internet Source	<1 %
14	www.mdpi.com Internet Source	<1 %
15	cris.maastrichtuniversity.nl Internet Source	<1 %
16	link.springer.com Internet Source	<1 %
17	Tim GB Hart, Yul Derek Davids, Stephen Rule, Precious Tirivanhu, Samela Mtyingizane. "The COVID-19 pandemic reveals an unprecedented rise in hunger: the South African Government was ill-prepared to meet the challenge", Scientific African, 2022 Publication	<1 %

18	repository.up.ac.za Internet Source	<1 %
19	core.ac.uk Internet Source	<1 %
20	etd.uwc.ac.za Internet Source	<1 %
21	opendocs.ids.ac.uk Internet Source	<1 %
22	research.csiro.au Internet Source	<1 %
23	www.disei.unifi.it Internet Source	<1 %
24	ir.haramaya.edu.et Internet Source	<1 %
25	journals.uj.ac.za Internet Source	<1 %
26	ukzn-dspace.ukzn.ac.za Internet Source	<1 %
27	Submitted to Chester College of Higher Education Student Paper	<1 %
28	Submitted to Mancosa Student Paper	<1 %
29	Submitted to University of the Western Cape	

	Student Paper	<1 %
30	pubmed.ncbi.nlm.nih.gov Internet Source	<1 %
31	Submitted to Kenyatta University Student Paper	<1 %
32	Molly Jacobs, Timothy R. McDade, Mateo Villamizar Chaparro, Michelle Corea. "Sick, Hungry, and Vulnerable: Federal Stimulus and Food Security on Marginalized Populations During the COVID-19 Pandemic", Journal of Racial and Ethnic Health Disparities, 2022 Publication	<1 %
33	research.library.mun.ca Internet Source	<1 %
34	uzspace.unizulu.ac.za:8080 Internet Source	<1 %
35	Submitted to University of Economics Ho Chi Minh Student Paper	<1 %
36	ebrary.ifpri.org Internet Source	<1 %
37	hrmars.com Internet Source	<1 %
38	repository.nwu.ac.za Internet Source	<1 %

		<1 %
39	www.webmeets.com Internet Source	<1 %
40	Ousmane Traoré, Omer S. Combary, Yasmina d.D. Zina. "Households' basic needs satisfaction during the Coronavirus disease 19 (COVID-19) pandemic in Burkina Faso", Health Policy OPEN, 2022 Publication	<1 %
41	Submitted to Asian Institute of Technology Student Paper	<1 %
42	Submitted to North West University Student Paper	<1 %
43	www.tandfonline.com Internet Source	<1 %
44	Sandile Mthethwa, Edilegnaw Wale Zegeye. "Household vulnerability to climate change in South Africa: A multilevel regression model", Development Southern Africa, 2022 Publication	<1 %
45	Submitted to University of Antwerp Student Paper	<1 %
46	Submitted to University of Greenwich Student Paper	<1 %

47	Submitted to University of Stellenbosch, South Africa Student Paper	<1 %
48	Submitted to University of Venda Student Paper	<1 %
49	remlapmot.github.io Internet Source	<1 %
50	repositorio.ufmg.br Internet Source	<1 %
51	Stoian, D.. "Making the Best of Two Worlds: Rural and Peri-Urban Livelihood Options Sustained by Nontimber Forest Products from the Bolivian Amazon", World Development, 200509 Publication	<1 %
52	etd.aau.edu.et Internet Source	<1 %
53	gtg.webhost.uoradea.ro Internet Source	<1 %
54	ulspace.ul.ac.za Internet Source	<1 %
55	"Sustainable Future for Human Security", Springer Science and Business Media LLC, 2018 Publication	<1 %

56	Kwame Adjei - Mantey, Millicent O. Awuku, Ruby V. Kodom. "Revisiting the determinants of food security: does regular remittance inflow play a role in Ghanaian households? A disaggregated analysis", Regional Science Policy & Practice, 2022 Publication	<1 %
57	bibliothek.wzb.eu Internet Source	<1 %
58	chaireconditionautochtone.fss.ulaval.ca Internet Source	<1 %
59	clearafred.wits.ac.za Internet Source	<1 %
60	edepot.wur.nl Internet Source	<1 %
61	onlinelibrary.wiley.com Internet Source	<1 %
62	worldwidescience.org Internet Source	<1 %
63	www.up.ac.za Internet Source	<1 %
64	Kelly Stamper Balistreri. "Older adults and the food security infrastructure", Applied Economic Perspectives and Policy, 2022 Publication	<1 %

65	P. Gepts. "Chapter 1 Tropical Environments, Biodiversity, and the Origin of Crops", Springer Science and Business Media LLC, 2008 Publication	<1 %
66	Violet Lasdun, Aurélie P. Harou, Christopher Magomba, Aika Aku. "COVID-19, climate shocks, and food security linkages: evidence and perceptions from smallholder farming communities in Tanzania", Environment and Development Economics, 2022 Publication	<1 %
67	a-chance-to-play.org.za Internet Source	<1 %
68	academic.oup.com Internet Source	<1 %
69	agri.ckcest.cn Internet Source	<1 %
70	centaur.reading.ac.uk Internet Source	<1 %
71	citeseerx.ist.psu.edu Internet Source	<1 %
72	jnfs.ssu.ac.ir Internet Source	<1 %
73	libstore.ugent.be Internet Source	<1 %

74	res.mdpi.com Internet Source	<1 %
75	tind-customer-agecon.s3.amazonaws.com Internet Source	<1 %
76	uir.unisa.ac.za Internet Source	<1 %
77	vital.seals.ac.za8080 Internet Source	<1 %
78	www.agincourt.co.za Internet Source	<1 %
79	www.conftool.net Internet Source	<1 %
80	www.dsd.gov.za Internet Source	<1 %
81	www.repository.unn.edu.ng Internet Source	<1 %
82	www.rsijournal.eu Internet Source	<1 %
83	www.theseus.fi Internet Source	<1 %
84	Jonathan A. Muir, Merga Dheresa, Zachary J. Madewell, Tamirat Getachew et al. "Food Insecurity amid COVID-19 Lockdowns: Assessing Sociodemographic Indicators of	<1 %

Vulnerability in Harar and Kersa, Ethiopia",
Cold Spring Harbor Laboratory, 2023

Publication

-
- 85 Mikovhe Maphiri. "Chapter 6 Food Security in South Africa: Lessons from the COVID-19 Pandemic on Creating Sustainable Value Chains Through Corporate Social Responsibility (CSR)", Springer Science and Business Media LLC, 2022

<1 %

Publication

-
- 86 Mohammad Reza Pakravan-Charvadeh, Hassan Vatanparast, Mahasti khakpour, Cornelia Flora. "Food Insecurity Status of Afghan Refugees is Linked to Socioeconomic and Resettlement Status, Gender Disparities and Children's Health Outcomes in Iran", Child Indicators Research, 2021

<1 %

Publication

-
- 87 Mohammad Reza Pakravan-Charvadeh, Moselm Savari, Haider A. Khan, Saeid Gholamrezai, Cornelia Flora. "Determinants of household vulnerability to food insecurity during COVID-19 lockdown in a mid-term period in Iran", Public Health Nutrition, 2021

<1 %

Publication

-
- 88 aiaee.org
Internet Source

<1 %

assets.researchsquare.com

89	Internet Source	<1 %
90	cgspace.cgiar.org Internet Source	<1 %
91	creativecommons.org Internet Source	<1 %
92	dissertations.umi.com Internet Source	<1 %
93	ereseach.qmu.ac.uk Internet Source	<1 %
94	nutritionj.biomedcentral.com Internet Source	<1 %
95	pim.cgiar.org Internet Source	<1 %
96	pubs.sciepub.com Internet Source	<1 %
97	purehost.bath.ac.uk Internet Source	<1 %
98	univendspace.univen.ac.za Internet Source	<1 %
99	www.abacademies.org Internet Source	<1 %
100	www.cordaidkinderstem.nl Internet Source	<1 %

101	www.dothemathkingston.com Internet Source	<1 %
102	www.econstor.eu Internet Source	<1 %
103	Abiodun Elijah Obayelu. "Households' food security status and its determinants in the North-Central Nigeria", Food Economics, 2012 Publication	<1 %
104	L. Pienaar, D. von Fintel. "Hunger in the former apartheid homelands: Determinants of convergence one century after the 1913 land act", Agrekon, 2015 Publication	<1 %
105	Yonas T. Bahta, Joseph P. Musara. "Quantifying the Impact of COVID-19 Relief Vouchers Schemes on Food Security: Empirical Evidence Insights from South Africa", Land, 2022 Publication	<1 %
106	"Zero Hunger", Springer Science and Business Media LLC, 2020 Publication	<1 %
107	Food Price Volatility and Its Implications for Food Security and Policy, 2016. Publication	<1 %
108	etd.uum.edu.my Internet Source	<1 %

Exclude quotes On

Exclude matches < 5 words

Exclude bibliography On