Promoting Food Security During the COVID-19 Pandemic: Community Resilience and Adaptation in Limpopo Province, South Africa

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Abstract

The COVID-19 pandemic represents one of the most significant challenges to global public health in the 21st Century. The apparent socio-economic impact of COVID-19, and associated restrictions aimed at preventing transmission, has led many Health Promotion practitioners to hypothesise an emergent food crisis within low-income communities - deemed vulnerable to exogenous shocks. Yet communities are not homogenous; vulnerability is a spectrum mitigated by the availability of community-level resources, or protective factors. As such, this study adopts the theoretical approach of Community Resilience to explore the dynamic socio-ecological phenomenon of COVID-19 related food insecurity across low-income rural communities in Limpopo Province, South Africa. Food insecurity is conceptually derived from the FAO's 'Four Pillars' definition of food security. Key objectives were to: (1) Explore current stressors of COVID-19 related food insecurity; (2) Explore the existence of community-level protective factors that maintain food security within Limpopo Province.

This study followed a qualitative phenomenological approach. Semi-structured interviews were conducted with nine rural community members in Mopani District (Limpopo) and relevant members of Civil Society Organisations (CSOs). This study found that despite Limpopo being historically one of the most food-secure provinces in South Africa, COVID-19 has undermined local food systems and exacerbated existing vulnerabilities causing food insecurity. Traditional coping strategies have been limited by COVID-19 restrictions but informal sector activity, natural capital, social capital and community competencies were found to act as important community-level protective factors that promoted food security. However, low economic development caused by historical racial inequality has bred resource inequities that fundamentally eroded resilience capacity. Although many protective factors exist that could and should be promoted within Health Promotion interventions are identified, the wider developmental pursuit of eradicating poverty remains key.

Keywords: Community Resilience, COVID-19, food security, Health Promotion, protective factors, South Africa, vulnerabilities.

Acronyms, Abbreviations & Local Terminologies

CAN	Community Action Network
CHoiCe	CHoiCe Trust Tzaneen
COVID-19	Coronavirus Disease 2019
CSO	Civil Society Organisation
FAO	Food and Agricultural Organisation
GTZ	Greater Tzaneen Municipality
ICT	Information and Communications Technology
IPC	Integrated Food Security Phase Classification
NGO	Non-Governmental Organisation
SA	South Africa
SDGs	Sustainable Development Goals
SFP	School Feeding Programme
SLF	Sustainable Livelihoods Framework
SOC	Sense of Coherence
SSA	Sub-Saharan Africa
TNA	Thematic Network Analysis
UN	United Nations
VSLA	Village Savings and Loans Association
WASH	Water, Sanitation and Hygiene
WHO	World Health Organisation

Induna - tribal councillor or headman.

Mealie meal - local dietary staple made of maize flour and boiled water.

Mopane worms - large edible caterpillar that feeds primarily on Mopane leaves.

Naartjies - South African term for a satsuma or mandarin.

Spaza shop - informal convenience store.

1. Introduction

1.1 Background

The COVID-19 health pandemic has emerged as one of the most pressing and complex challenges to global public health in the 21st century; multi-level and transdisciplinary adaptation and mitigation strategies across diverse sectors are under intense current scrutiny within the field of Health Promotion. Due to the socio-economic impact of COVID-19 on global food systems, one sector under particular focus is that of nutrition and food security (Devereux et al., 2020; Laborde et al., 2020). Food security is defined by the Food and Agricultural Organisation (FAO) as the situation when: "all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life." (FAO, 1996). Within this definition are four key conceptual 'pillars': (1) Food Availability; (2) Food Access; (3) Food Utility; and (4) Food Stability (FAO, 2008)[1]. The FAO's 'four pillars' framework will provide an essential understanding of food security across this thesis. COVID-19 represents a distinct threat to food security; capable of eroding each pillar and contributing to malnutrition, the effects of which are linked to a range of health morbidities and comorbidities (Martins et al., 2011). As such, food security is a designated human right, a basic requirement for health as a resource for everyday life - rhetoric explicit within the Ottawa Charter for Health Promotion - and 'Zero Hunger' is a key goal within the 2015 Sustainable Development Goals (SDGs) (UN, 1948, 2015; WHO, 1986).

1.2 Study Context

The right to food security is explicit in the South African Constitution, however household-level food security remains a significant problem (Department of Statistics, 2019; Government of the Republic of South Africa, 1996). Divided by sharp socio-economic inequalities centred upon racial background and geographic location, an estimated 1.7 million (11%) South African households experienced hunger in 2017 (Department of Statistics, 2019). Situated in the North-East of South Africa, Limpopo Province experiences a disproportionate level of poverty in South

[1] The FAO defines the four pillars of food security accordingly:
Food Access – access by individuals to adequate resources for acquiring appropriate foods for a nutritious diet.
Food Availability – the availability of sufficient quantities of food of appropriate quality, supplied through domestic production or imports (including food aid).
Food Utility – utilisation of food through adequate diet, clean water, sanitation and health care to reach a state of nutritional well-being where all physiological needs are met.
Food Stability - a population, household or individual must have access to adequate food at all times regardless of sudden shocks or cyclical events. Stability can therefore refer to both availability and access. (FAO, 2006).

Africa. In 2017, 40% of the population were living under the National Food Poverty Line[2] and a worsening socio-economic landscape has resulted in a 44% unemployment rate, the second highest provincial figures in South Africa (Department of Statistics, 2017, 2020a). However, Limpopo is also one of the most food secure Provinces; 93% of households reported adequate food security in 2018 compared to the national average 80% (Department of Statistics, 2018a). Thus, Limpopo is an appropriate location for the exploration of community resilience, factors beyond household income that enable food security must exist.

However, COVID-19 and resultant restrictions represent an ongoing crisis to the experience of food security in Limpopo. The national lockdown, 27th March 2020 – 1st May 2020, and range of restrictions throughout the phased re-opening, 1st May 2020 – Present, have undermined many components of rural food systems in Limpopo. Further worsening formal employment, informal sector restrictions, food price inflation, suspension of school feeding programmes (SFPs) and supply chain disruptions are placing significant stress on an already socio-economically vulnerable population, threatening food insecurity (Department of Statistics, 2021; IPC, 2021; Limpopo Democratic Alliance, 2020). Indeed, the most recent quarterly Integrated Food Security Phase Classification (IPC) analysis has predicted a food security crisis in Limpopo, January 2021 – March 2021 (IPC, 2021).

1.3 Problem Statement & Research Objectives

Although much about the negative impact of COVID-19 on food security in rural South Africa is hypothesised, little empirical literature exists to be drawn upon to frame interventions. As such, this research study aims to provide a thick descriptive background regarding the current contextual stressors of COVID-19 related food insecurity, exploring the impact COVID-19 has had on food access, availability, utility and stability. Understanding the experience of rural communities across all aspects of food security will prompt more robust responses, given the inter-related nature of food systems. Additionally, the appraisal of existing community-level protective factors that can be rapidly mobilised could enable swifter positive outcomes than top -down mechanisms, especially given the current pressure the South African Government is under combatting COVID-19 itself.

[2] Defined as, "the amount of money that an individual will need to afford the minimum required daily energy intake". The latest figure is R585 (approximately $42 USD) per person per month (Department of Statistics, 2020b).

The research objectives of this study are thus:

1) Explore the experience of food security during the COVID-19 pandemic in Limpopo Province, South Africa; with focus on a rural low-income community.

Sub-objectives:

1) Explore current stressors of COVID-19 related food insecurity, mapping the impact of COVID-19 across Access, Availability, Utility and Stability;
2) Explore community-level adaptive strategies and protective factors that contribute to positive food security outcomes within Limpopo Province.

1.5 Outline of Thesis

This thesis consists of seven chapters. Following this introduction, which has introduced the study context, the theoretical framework is established. In chapter three the current literature surrounding the topic is reviewed. Chapter four outlines the methodology while chapter five presents the study findings. Findings are discussed in chapter six, study limitations are also assessed. Chapter seven presents the conclusion and provides recommendations.

2. Theoretical Framework

A theoretical framework provides the lens through which the study of a phenomenon can be orientated; defining both the objective focus and framing of inquiry (Creswell, 2014). The strengths-based theory of Community Resilience guides this study – a theoretical framework that requires unpacking before it can be applied.

2.1 Resilience Theory

Resilience as a socio-ecological concept was first introduced in 1973, driven by the underlying scientific metaphor of a return to equilibrium (Holling, 1973). Common definitions within resilience literature, though varied in specificity, acknowledge the ability to successfully adapt, maintain function and allow for future development following the introduction of a 'stressor'; or set of adverse socio-ecological conditions (Adger, 2006; Folke, 2006; Ungar, 2005). Resilience Theory has emerged within the 'toolbox' of Health Promotion and, although initially focused on the individual-level, is now commonly applied at community-level to assess resilience promoting protective factors as opposed to isolating vulnerabilities.

A community consists of a population bound by a specific geographic area that shares a, "sense of identity and a network of relationships" (Green et al., 2015, p.41). The conceptually

apparent ‘network’ comprises a dynamic socio-ecological system constructed by community members, as such individual resilience is integral to wider community resilience (Berkes & Ross, 2013; Boon et al., 2012; Nelson et al., 2007). However, the hypothesis that membership of a community results in synergetic outcomes is fundamental, implying the community collective is “more than the sum of its parts” (Rose, 2004, p.309).

The Community Resilience framework provides an apparatus to apply this knowledge. For this study, Community Resilience is conceptually defined by Norris et al. as, “a process linking a network of adaptive capacities (resources with dynamic attribute) to adaptation after a disturbance or adversity” (Norris et al., 2008, p.127). See Appendix 1 for an adapted Community Resilience model outlining the theoretical approach to this study.

2.2 Resilience Framework

The model (Appendix 1) begins by determining pre-event function to establish a baseline upon which the conceptual approach of Community Resilience can be established. Next, the model introduces a ‘Crisis’, resulting in either resistance or transient dysfunction due to system threshold shocks; the response of the system to this crisis in either leading to post-event function or persistent dysfunction depends on the dynamic relationship of the stressor and resources. The impact of the stressor is linked to its severity, duration and surprise; influenced by the socio-ecological system within which it is embedded. Similarly, adaptive capacity of resources is determined by their robustness, redundancy[3] and rapidity - shaped by the same socio-ecological influence. Application of the concepts is shown in the model and will be used in the discussion.

Understanding the community as a complex socio-ecological system is shown by Norris et al. in their Community Resilience framework by the adoption of four inter-related, “primary adaptive capacities”: Economic Development; Social Capital; Information and Communication; and Community Competence (Norris et al., 2008, p.136). Norris et al. isolate these adaptive capacities in a distinct model designed to operationalise interventions at the community resource level. Importantly, adaptive resources only become adaptive capacities when mobilised – in other words, *actually* used. This understanding is what sets the Community Resilience framework apart from the more static assessment of capital assets seen within approaches like the Sustainable Livelihoods Framework (SLF) (for example, Mhlanga & Ndhlovu, 2020). Approaches such as the SLF focus on identifying the availability of neatly defined asset stocks, often missing the contextual realities that determine actual functioning of the system (Carr, 2013; Levine, 2014).

[3] The availability of substitutable resources that maintain function, function in this thesis is related to food security.

Thus, Community Resilience theory is utilised in this thesis to provide an understanding of food security related adaptation to COVID-19, whilst acknowledging the dynamic socio-ecological environment within which adaptive capacity is influenced.

3. Literature Review

3.1 Introduction and Search Strategy

The following section provides a critical overview of literature related to: (1) the emergent impact of COVID-19 on food security in South Africa; and (2) the assessment of rural community resilience in South Africa. Literature was found using a combination of research search engines: Google Scholar, Web of Science, Scopus and Oria. Keywords used were: "adaptation", "adaptive capacity", "Community Resilience", "Coronavirus", "COVID-19", "food security", "food systems", "Greater Tzaneen", "Limpopo", "Mopani", "nutrition", "protective factors", "resilience", "South Africa", "Tzaneen" and "vulnerability". Truncation of search terms was also used. Literature post-2010 was prioritised unless highly relevant. A snowball method using reference lists was also employed to discover further relevant literature. All literature has been peer reviewed and is written in English.

3.2 FAO's Four Pillar Framework & COVID-19

At this stage there is little empirical research relating to the impact of COVID-19 on food security in South Africa. However, thematic analysis can also be drawn from wider literature within sub-Saharan Africa (SSA) and theoretical scenario analyses. It should be noted that the main influence on food security stems from COVID-19 related restrictions rather than viral pathosis (Devereux et al., 2020; Laborde et al., 2020; Moseley & Battersby, 2020). Indeed, at household-level SSA survey data shows concerns centre upon economic not health factors (Chiwona-Karltun et al., 2021). High levels of unemployment and wage reduction in South Africa caused by the COVID-19 restrictions have caused a dramatic decline in household income, decreasing economic access to food particularly among low-income households and those reliant on low-education labour employment (Arndt et al., 2020; Iwara et al., 2020; Visagie & Turok, 2020). Informal sector restrictions have caused a further decline in household income (Paganini et al., 2020; Wegerif, 2020). Furthermore, food price inflation attributed to a decline in availability of food and oligopolistic nature of formal markets following erosion of informal markets has further reduced economic access to food (Paganini et al., 2020; Wegerif, 2020). Travel and transport restrictions have also restricted physical access to food, both within South Africa and through SSA

(Iwara et al., 2020; Nechifor et al., 2021). Finally, additional pressure to already vulnerable household food systems has been caused by the closure of school feeding programmes (SFPs) (Kansiime et al., 2021; Van der Berg & Spaull, 2020).

COVID-19 has influenced food availability by disrupting supply chains. Restrictions have undermined typical crop planting calendars due to shortages of agricultural inputs such as seed, fertiliser and labour (Ayanlade & Radeny, 2020; Kansiime et al., 2021). Importantly, input shortages have affected both commercial and subsistence-level agriculture that, accompanied by transport disruptions, have resulted in reduced food availability across both informal and formal food markets (Iwara et al., 2020; Paganini et al., 2020). Internationally, restricted global food exports are linked to a knock-on decline in availability (Falkendal et al., 2021; Udmale et al., 2020). Impacts on food utility are addressed through evidence that COVID-19 has forced the adoption of negative coping strategies such as skipping meals, reducing meal size or relying on cheaper food types; reducing nutritional profile and diversity (Quaife et al., 2020; Kansiime et al, 2021). Issues of food stability are obvious from the apparent literature; defined as it is by the dynamic relationship of access, availability and utility over time.

3.3 Food Security and Community Resilience in South Africa

3.3.1 Assessing Vulnerabilities

Predominantly, literature regarding food security and community resilience is founded upon the assessment of vulnerabilities; low-income rural black communities in South Africa have been highlighted as especially vulnerable (Altman et al., 2009; Labadarios et al., 2011). Parallel socio-economic and health systems split along racial lines are deeply embedded in South Africa due to the legacy of Apartheid; further exacerbated by the unequal impact of the HIV/AIDS pandemic on low-income households. Much literature holds that these two factors account for many of the vulnerabilities presented below and that the unequal experience of COVID-19 related food insecurity is indicative of their continued influence (Mkhawani et al., 2016; Naidu, 2020; Pienaar & Von Fintel, 2014; Shackleton & Luckert, 2015).

Household characteristics within low-income communities in South Africa lend credence to their apparent vulnerability. Low household education, prevalent in much of rural South Africa, is linked to lower income as formal employment is inaccessible or limited to low-paid wage labour (De Cock et al., 2013; Megbowon & Mushunje, 2018). Relevant to this study, low-educated populations traditionally reliant on low-paid wage labour are highly vulnerable to COVID-19 related food insecurity (Arndt et al., 2020; Swinnen & McDermott, 2020). As food expenditure accounts for a high percentage of income among low-income households, vulnerability to income

or price shocks is increased (Baiphethi & Jacobs, 2009; Mkhawani et al., 2016). Additionally, unemployment and low-income undermine adaptive capacity building as physical and financial capital assets cannot be accumulated (Drysdale et al., 2021a; Mthembu & Zwane, 2017). Further to this, limited formal sector employment forces a reliance on the more vulnerable informal sector - as has been seen during COVID-19 (Horwood et al., 2021; Schenck et al., 2020). Literature also commonly explores both gender and household dependency ratios as vulnerabilities. Typically high dependency ratios spread resources thinly and reduce redundancy pathways (Musemwa et al., 2015; Ndhleve et al., 2012). Regarding gender, women are more likely to experience food insecurity and related stress – a continuation of endemic gender disparities in South Africa (Horwood et al., 2021; Tibesigwa & Visser, 2016). Accordingly, COVID-19 related food insecurity is influenced by both dependency ratio and gender (Chiwona-Karltun et al., 2021; Iwara et al., 2020; Paganini et al., 2020). Household characteristics fundamentally influence livelihood decision making (Ofoegbu et al., 2016).

Beyond household characteristics, vulnerabilities related to natural capital are commonly assessed due to the importance of agriculture in rural low-income communities (Baiphethi & Jacobs, 2009; Ngumbela et al., 2020). A changing climate threatens food insecurity due to the typical reliance on rain-fed agriculture among smallholder households; adverse climatic conditions are reducing agricultural yields and food security (Connolly-Boutin & Smit, 2016; Drysdale et al., 2021b; Shisanya & Mafongoya, 2016). Environmental extraction costs represent another long-term threat to natural capital (Mavengahama et al., 2013; Paumgarten et al., 2018). Also, the socio-political dispute over land access following Apartheid has meant low-income rural households often have limited access to suitable agricultural land (Binswanger-Mkhize, 2014; Kepe & Tessaro, 2014). Furthermore, physical capital vulnerabilities are often explicit. A lack of fit-for-purpose infrastructure prevents technological growth and adaptive resource mobilisation; inefficient dissemination of information from relevant stakeholders is also prevalent (Drysdale et al., 2021a; Ngumbela et al., 2020; Selepe et al., 2015).

Common ‘fixes’ recommended in response to vulnerability assessments revolve around top-down policy change and external capital investment. Improvements in education, economic investment, social protection, infrastructure, agriculture and food policy are frequently cited (Abdu-Raheem & Worth, 2011; d’Agostino et al., 2018; De Cock et al., 2013; Ngema et al., 2018). However, external interventions have often failed to enable effective outcomes (Pereira & Ruysenaar, 2012; Zembe-Mkabile et al., 2016). In some cases, even causing unforeseen negative consequences such as increased dependence or marginalisation (Mukumbang et al., 2020; Sinyolo

et al., 2019). Perhaps unsurprisingly, many recommendations for mitigating COVID-19 related food insecurity have centred on the provision of capital and policy support by the South African Government (Arndt et al., 2020; Ezirigwe et al., 2020; Lawson-Lartego & Cohen, 2020; Visagie & Turok, 2020).

3.3.2 Assessing Protective Factors

Conceptualising community resilience through the assessment of protective factors assumes that low-income rural communities in South Africa do have adaptive capacity; in comparison, there is much less research into these protective factors. Indigenous knowledge systems are frequently explored as a protective factor that helps maintain food security; for example the forage of wild food compensates for other access, availability or utility issues (Lottering et al., 2021; Masekoameng & Molotja, 2019; Mungofa et al., 2018). Knowledge of seasonal planting times, traditional fertilisers, mixed cropping practices and seed storage that increase agricultural yield are also highlighted as protective factors (Apraku et al., 2018; Rankoana, 2016; Ubisi et al., 2019). Indigenous knowledge that enables non-agricultural vending, such as craftwork, also increases household income (Sharaunga, 2019). Linked to this, entrepreneurial drive, influenced by the socio-ecological sphere, represents another protective factor (Cele & Wale, 2020; Sharaunga & Mudhara, 2021; Sinyolo & Mudhara, 2018b). Additionally, community-level indigenous governance systems can be more in-tune with contextual realities and enable better problem solving (Walters et al., 2021).

Social capital is often analysed as a protective factor, one that enhances adaptive capacity and facilitates the use of existing physical and human capital (Mbiba et al., 2019; Thamaga-Chitja & Tamako, 2017). High social capital is often attributed to rural communities because of shared kinship and geographic intimacy (Wesselow, 2019; Wiesinger, 2007). Beneficial inter- and intra-community networks empower food system co-operation; community land and labour sharing, inter-household food aid and food market 'lending' are all examples (Apraku et al., 2018; Masekoameng & Molotja, 2019; Mbiba et al., 2019). Higher social capital has been linked to improved health outcomes following both COVID-19 and previous system shocks (Harte et al., 2009; Paganini et al., 2020; Tibesigwa et al., 2016). However, COVID-19 presents a threat to social capital because of social restrictions (Moseley & Battersby, 2020; Mukumbang et al., 2020). Additionally, social capital in isolation is often insufficient in overcoming other capital vulnerabilities (Mbiba et al., 2019; Sharaunga, 2019).

Finally, despite apparent vulnerabilities of natural capital, subsistence agriculture is a protective factor used extensively to maintain food security within poor rural communities (Aliber & Hart, 2009; Baiphethi & Jacobs, 2009; Mbajiorgu, 2020). Indeed, rural households engaged in subsistence agriculture have been seen as more resilient to COVID-19 food insecurity due to their independence from national and international food systems (Chiwona-Karltun et al., 2021; Clapp & Moseley, 2020; Erokhin & Gao, 2020; Paganini et al., 2020).

3.4 Research Gap

This research study intends to fill two main gaps in the literature. The first is the need for empirical data related to the impact of COVID-19 on food security in South Africa. The second is the conceptual gap of understanding that exists over the role of protective factors and the socio-ecological sphere within community resilience; as such this research also answers the call for further empirical study to test adaptive capacity hypotheses. Adaptive capacity is too often conceptualised through the assessment of vulnerabilities which presents problems. The first is that vulnerabilities are often prescribed by 'experts' via top-down mechanisms that emphasise an external responsibility for adaptation. Quantifiable socio-economic and capital asset vulnerabilities require interventions largely out of reach to poor communities thus research is needed that can present immediately available solutions. Consequently, the contextual nature of adaptive capacity and existence of beneficial socio-ecological factors has frequently been ignored. Focusing on the risk factors associated with vulnerabilities restricts adaptation within accepted parameters – therefore progressive research that focuses on internal capabilities to broaden understanding is necessary. Finally, the role of the socio-ecological sphere within which poor communities experience food security needs exploration; too often in the literature socio-ecological factors are treated in isolation and a holistic 'bottom up' understanding of their dynamic interplay is due.

4. Methodology

In this chapter the methodology followed within this research study is outlined. The epistemological standpoint and resultant research design that frames the study is explained; the study site, recruitment of informants, methods of data collection and data management are then reviewed. Finally, the complex issues of data trustworthiness, researcher positionality and the ethical considerations of the study are discussed.

4.1 Research Design

Philosophical foundations of a research study have profound influence over the process of inquiry and presentation of findings (Carter & Little, 2007). Defining the epistemological and ontological position guides the approach to acquiring and interpreting knowledge and understanding reality (Neuman, 2011). The interpretivist philosophical approach, a branch of interpretive social science, is centred upon the ontological premise that multiple realities exist; knowledge is constructed out of personal perceptions and interactions with social phenomena (Neuman, 2011, pp.102-107). This philosophical lens assumes the relativist axiological view that science is inherently value-laden, but that value positions are an intrinsic product of individually constructed reality and thus equally valid (Peile & McCouat, 1997).

Congruently to the interpretivist epistemological standpoint, this research study best suited a qualitative phenomenological approach. A phenomenological approach is aimed at, "understanding the essence" of the phenomenon, primarily through interpreting the lived experience of purposively selected informants (Creswell, 2013, p.104). The research phenomenon in question is the lived experience of food security during COVID-19 in Limpopo Province, South Africa. As such, the conceptual framework, epistemological approach and research design used formed an appropriate foundation for this study.

4.2 Study Area

This study was conducted in the Greater Tzaneen Municipality (GTZ) of the Mopani District, Limpopo Province South Africa. GTZ covers 2,897km² and has an estimated population of 416,146, of which 97% are Black African (Department of Statistics, 2018b). There are 125 rural villages in GTZ, in which an estimated 80% of households reside; the most recent census (2011) put unemployment at 36.7%, but an estimated 41% of the population have no income source (Department of Statistics, 2012). GTZ relies on agriculture and does have favourable agro-ecological conditions; 36,793 households in GTZ are classed as agricultural households (Department of Statistics, 2012).

4.3 Participants & Recruitment

4.3.1 CHoiCe Trust

CHoiCe Trust (CHoiCe) is a local non-governmental organisation (NGO) that operates within GTZ; CHoiCe is currently active across a diverse spectrum, providing both direct health

services and capacity building projects covering food security and food garden training, WASH training and personal finance training. This is by no means an exhaustive list but frames the important role of CHoiCe in the local area and explains their strong relationship with the local community. CHoiCe acted as the local gatekeeper, solving the issue of "gaining entrée" to the research setting (Luker, 2008, p.146). Working with a representative of CHoiCe, who acted as both a local research assistant and translator, rural participants within GTZ were recruited. CHoiCe were essential in facilitating remote access to rural participants and overcoming COVID-19 travel restrictions, data collection would not have been possible otherwise.

4.3.2 Participants

Participant Group 1 - formed the focus of this research study, with participants selected from rural communities within Greater Tzaneen Municipality. Participants within this group participated within the pre- and post-COVID household food system and had personal experience of the COVID-19 socio-economic restrictions. Five participants have a pre-existing relationship with CHoiCe having enrolled in prior or ongoing local projects, four participants have no-prior relationship with CHoiCe. Participants were read a translated informed consent (see original, Appendix 2) via phone and gave verbal consent prior to each interview.

Participant Group 2 - consisted of key informants, or participants with knowledge of food security and the relationship with socio-economic COVID-19 restrictions. In the initial study proposal this group was intended to consist of both local government and NGO representatives. In practice recruiting local government representatives remotely proved impossible, attributed to low efficacy of email introductions and political sensitivities around the COVID-19 pandemic response. Two NGO representatives were selected from relevant NGOs actively participating within food security related projects in GTZ and contacted via email with participant information letters; informed consent was given verbally during interviews.

4.3.3 Recruitment

Participants were purposively selected utilising local knowledge to ensure that participants matched the research criteria and afforded the best opportunity for fully understanding the research phenomenon in question. The local research assistant, acting as a representative of CHoiCe, contacted five potential participants via phone through a known directory that CHoiCe had already established. To minimise potential biases associated with a pre-existing relationship with CHoiCe, snowball sampling was also utilised. Participants beyond the established CHoiCe directory were

introduced via already selected participants. Utilising CHoiCe and a local research assistant encouraged trust amongst local participants, local familiarity and pre-existing nature of relationships was advantageous. CHoiCe also acted as gatekeeper within the recruitment of key informants. Email introductions enabled direct access to relevant participants and established mutual rapport – essential given the time pressures experienced by key informants as a result of the COVID-19 pandemic and community impact.

4.4 Methods

Due to the nature of the COVID-19 international travel restrictions, this research study relied upon the use of remotely conducted semi-structured in-depth interviews and document analysis. International travel restrictions precluded the use of previously anticipated participant observation, while the combination of local social distancing measures and technology limitations made the use of focus group discussions or group interviews untenable. The following paragraphs illustrate the document analysis and remote interview process used.

It was logical to begin the qualitative process of inquiry with document analysis as it provided an initial insight into the experience and landscape of food security during the COVID-19 pandemic. See Appendix 3 for document analysis protocol. Document analysis, a systematic procedure for reviewing relevant documents, is advantageous primarily as a complementary method of data triangulation (Bowen, 2009). This is due to a number of factors including availability, cost-effectiveness, data stability, unobtrusiveness and exactness (Bowen, 2009, p.31). Given the COVID-19 restrictions and proliferation of grey literature during the pandemic, document analysis was a particularly feasible method for data collection. Newspaper articles in particular were useful in understanding the phenomenon across Limpopo. Government documentation related to food security and COVID-19 in Limpopo Province enabled policy insights given the inability to access local government representatives as participants.

Interviews are an important qualitative research method; specifically structured and purposeful conversation with an informant, controlled by the researcher, enables the collection of relevant data (Kvale & Brinkmann, 2009, p.3). One-to-one in-depth interviews following a semi-structured questioning procedure were utilised to maximise the emic perspective, eliciting lived experience of the social phenomena in focus. Semi-structured interviewing is proper within a 30 ECTS phenomenological study due to time limitations and practicalities. A short topic guide (see Appendix 4) framed the interview but allowed for internal flexibility, maintaining the dynamic question process essential in fully exploring the informant's interpretation of the phenomena

(Punch, 2014). Interviews were conducted remotely via a combination of mobile phone and the online web-based video-conferencing platform Zoom (Zoom, 2020). Zoom served as the primary data collection tool due to its secure recording functionality, robust interface and proven user satisfaction as an interview medium (Archibald et al., 2019). The high penetration of the mobile phone in rural GTZ was crucial in overcoming COVID-19 restrictions and enabling participants to participate from home using a device with which they are familiar. In practice, due to the strict local social distancing measures and local technological realities, participants were contacted via mobile phone by the local research assistant and placed on loud speaker. The research assistant was sat in a private office while in contact with myself through a pre-arranged Zoom video meeting. The interviews were then conducted with the research assistant acting as a translator.

4.5 Data Analysis

Data have been analysed using Thematic Network Analysis (TNA). TNA provides a robust tool for the analysis of qualitative data (Attride-Stirling, 2001). In this process, datum is coded dependent on essential meaning and categorised to allow analysis of common themes. The rigorous six step approach to TNA outlined by Braun and Clarke (2006, p.87) was used: (1) transcription and familiarisation of data; (2) generation of initial codes; (3) identification and collation of codes into themes; (4) review of themes and generation of thematic network; (5) refinement and interpretation of themes; (6) analysis of themes. TNA is an iterative process, in keeping with the interpretivist principle of relativism that dictates the researcher should interpret essential meaning inductively (Kukla, 2013). The software package NVivo 12 was used to support the organic process of inductive coding.

4.6 Data Trustworthiness

Issues of data trustworthiness in qualitative research are usually assessed through the following four concepts: credibility, dependability, transferability and confirmability. Each of the apparent concepts has remained in focus throughout. Credibility is achieved when data findings are true and accurate from the point of view of researcher, participants and readers (Bryman et al., 2008, p.266). Essential meanings were clarified both during the interview itself to prevent translation bias and post-interview through the sharing of data and follow up meetings with the local research assistant and CHoiCe representatives. While the direct sharing of transcriptions with rural participants was impossible given COVID-19 restrictions, utilising a local research assistant who had an in-depth understanding of the local community and contextual realities mitigated the

loss of essential meaning in data translation, improving data credibility. Transcriptions were shared with key informants to ensure correct meaning. Document analysis was also used as an important method of data triangulation (Bowen, 2009).

Dependability requires that the process of inquiry is consistent over time, method and researcher (Yilmaz, 2013, p.319). Throughout this study the research process has been explained in detail and methodological choices justified according to research setting and process of inquiry. Limitations have been raised and explained to achieve methodological transparency. Multiple meetings with the research assistant and CHoiCe representatives prior to data collection to ensure mutual understanding and methodological consistency were also important in ensuring dependability. The same interview guide was used and all interviews were recorded. In addition, data analysis stuck rigorously to the Braun & Clarke six-step approach to TNA.

Transferability in qualitative data is problematic given the subjective nature of lived experience but is generally accepted as the cross-applicability of findings (Yilmaz, 2013, p.320). In this study a complete description of process of inquiry, study site and participants has been given. Although local contextual realities cannot be directly applied to different research settings, major themes can be extrapolated across similar socio-ecological systems and methods can be replicated. Coherence with established literature is another barometer for transferability, this research study is in line with established academic thought (Tracy, 2010, p.845).

Confirmability requires that data findings are neutral and logical, not a result of researcher biases (Bryman et al., 2008, p.266). Issues of positionality were important to be aware of. As an outsider lacking contextual understanding, the impact of pre-conceived biases were mitigated against through a bracketing exercise undertaken prior to data collection. In addition, the use of a local research assistant allowed a greater level of familiarity and trust therefore lessening potential biases caused by unequal researcher-participant power dynamics. Each methodological step was examined reflexively to find evidence of positionality bias. For example, the interview topic guide was re-drafted following the bracketing exercise to reduce assumptions of participant vulnerability. Finally, the transparent use of TNA and visual representation of this process in Appendix 6 allows readers to judge the confirmability of data.

4.7 Research Ethics

Consideration of research ethics was important, as researchers aim to: “do good, and do no harm” (Bonell et al., 2006, p.1138). This required an evaluation and implementation of protective steps against potential negative consequences for the research participants. Two key steps were

taken to maintain ethical research practice: providing informed consent and achieving confidentiality and anonymity. Informed consent represents a contractual agreement that the rights of the informant are to be protected (Creswell, 2003, pp.64-65). Relevant to this project informants were made fully aware of research purpose, procedure and participation rights with the informed consent form being translated into local language.

Confidentiality develops a researcher-informant bond of trust that sensitive information will be handled correctly (Punch, 2014, p.47). Correct data management procedures have been practiced throughout this study to ensure confidentiality and ethical compliance. Zoom is a highly secure video-conferencing platform and all video recordings were stored separately to identifying personal data within the University of Bergen SAFE server platform. Participant names were anonymised and coded, transcriptions were then also stored securely. A data agreement between myself and CHoiCe (as the representative of the local research assistant) was signed protecting participants from potential third party use.

Furthermore, this study explored sensitive topics such as food insecurity. Vulnerable communities formed study participants; the realities of everyday life and existing physical and emotional stress demanded sensitivity – especially relevant considering the impact of the COVID-19 pandemic. Research questions were evaluated for appropriateness alongside the local research assistant. Data collection methods also impinged no pecuniary costs on already low-income participants. All recruitment of participants was done via COVID-safe methods that maintained social distancing and local restrictions. Data collection done was done remotely to remove health risks of face-to-face research practice. Moreover, ethical issues of positionality (addressed previously) and beneficence had to be understood as an affluent 'white' researcher in a low-income South African community. These were mitigated by informed consent.

This research study achieved ethical clearance from the Norwegian Centre for Research Data (Appendix 7) and the Limpopo Provincial Research Ethics Committee (Appendix 8).

5 Findings

In this chapter the findings are presented. Findings are drawn from the in-depth interviews; document analysis provided contextual support but discovered no further divergent findings. Findings have been organised into two global themes as per the process of TNA, namely: '*Vulnerabilities*' and '*Protective Factors*'. Findings are organised as such with sub-sections exploring the respective organising themes and attendant basic themes of each (see Appendix 5).

Interview quotations have been re-phrased into first person following translation to aid in readability. Local participants have been given pseudonyms.

5.1 Vulnerabilities

As per the first sub-objective of this research study, the exploration of COVID-19 as a stressor will be presented. In this section 'Pre-COVID-19 Vulnerabilities' will be highlighted, followed by the impact of COVID-19 as both a 'Food System Stressor' and 'Community System Stressor'. The 'Food System' covers the FAO Four Pillar framework of Access, Availability, Utility and Stability. The 'Community System' explores the wider socio-ecological experience of community vulnerability to COVID-19 food insecurity.

5.1.1 Pre-COVID-19 Vulnerabilities

Adverse Household Characteristics - the primary household characteristic that participants shared was their geographic location, all nine local-level participants lived rurally. While this was not directly linked to vulnerability by participants it was an implied root cause of wider vulnerabilities. Geographic distance from formal markets required expensive transportation to physically access food sources: *"Even before COVID I was not going to town much because I can't afford to do so" (Tshegofatso)*. A dearth of local employment options was also linked to rural geography although this will be explored in greater detail in the section, 'Inadequate Employment Opportunities'. Gender and education level were also found to be important household-level characteristics that influenced employment. As Lesedi noted: *"I haven't got a good education, there are no jobs in the village, there are no jobs for women" (Lesedi).*

This lack of local employment opportunities was borne out elsewhere as most participants experienced low household economic activity even before COVID-19, with formal employment especially limited. *Karabo's* experience was typical: *"There is no one in the household that is working" (Karabo).* Low household economic activity among participants presented as problematic due to the knock-on effect this had on household income and the ability of households to accrue further, potentially beneficial, resources. Monthly household income before COVID-19 for six of nine participants was below R585 per person, the 2020 National Food Poverty Line. Accordingly, when asked if participants owned resources such as land, livestock or savings the response was often negative: *"I don't own these kind of things [land, livestock or savings]" (Amogelang). Lesedi's* household, who typically relied upon less than R360 per person per month,

were unable to start a food garden due to low capital wealth, highlighting the opportunity cost of low income. This experience was echoed at key informant level: *"Starting a food garden sounds so lovely you'd think the input costs would be low… [but] you need a fenced area so really there are resources to be put out from the beginning and people don't have that" (Participant 201).*

High dependency ratios were also common across participants. For example, *Omphile's* household dependency ratio was 1:3; *Karabo's* was 1:2 and *Lesedi's* was 1:3.5. Many participants noted the added quantity of food this required to feed everyone and the added burden on household income, *"Buying food for a big family is expensive" (Kamogelo)*. It also limited employment options: *"I can't travel far [to find employment] because of the children, I have to look after the children" (Lesedi)*. Antithetically however, the presence of children in the household often afforded access to social protection schemes. This will be explored in greater detail within, 'Pre-COVID-19 Protective Factors'. However it shows the conflicting nature of household size, simultaneously increasing both vulnerability and access to resources.

Weak Labour Market - findings in 'Adverse Household Characteristics' show unemployment as a significant vulnerability, fundamental causes of unemployment can be attributed to structural weaknesses in the labour market. As mentioned, the geographic location of participants was disadvantageous as formal employment opportunities were limited in rural GTZ: *"There are no jobs for us, it is hard to find a job" (Kamogelo)*. In addition, the formal employment opportunities that were available were found to be low paying and/or unstable seasonal or part-time positions: *"But the work it was not permanent. Those are seasonal jobs picking oranges, picking tomatoes and lemons" (Omphile)*. Reliance on unstable part-time or seasonal work puts households at particular risk of negative consequences following the introduction of a socio-ecological stressor, like COVID-19. Additionally, participants were found to lack alternative or multiple sources of income: *"He [husband working part-time] is the only source of living" (Amogelang)*. Dependency on poor, low-paying employment was therefore a typical vulnerability that further undermined household income and thus household capacity.

Pre-Existing Mal-Utility - despite many participants stating that they had little problem accessing food before COVID-19, many responses highlighted a problematic reliance on mielie meal, or maize meal, as the fundamental dietary staple. All nine local participants spoke or referenced the importance of mielie meal within their diet, for example: "*The mielie is very important, we normally eat it both lunch and dinner" (Lethabo)*. Perhaps more explicitly, *Rethabile's* household, who lacked a garden to grow vegetables, provided an example of the apparent inadequacies in

local nutritional diversity: *"The [only] food that we are buying is mielie meal and meat" (Rethabile)*. These findings point to a discrepancy between 'feeling full' and achieving a balanced and nutritious diet. A problem also acknowledged at key informant level: *"This is the difference between a food garden and food security. It is that people grow maize so they are full, but maize does not have much nutritional content" (Participant 201).*

Vulnerability of Subsistence Agriculture - subsistence agriculture, as is explored later within the findings, is an important household protective factor but remains vulnerable to external factors. Primarily, subsistence agriculture was highly dependent on the availability of water for which households relied on rain-fed agriculture, yet the absence of rainfall during the dry season presented a serious problem: *"When it is no longer raining we won't be able to plant as easy as there will be no water. This is important as we use the garden for food" (Kamogelo)*. Rural community households were often found to lack access to appropriate non-rainfall water supplies during the dry season, *"For us, it was difficult and challenging. Because getting water to water my plants… I fetch it far away from my household [during the dry season]" (Amogelang)*. The inherent risk associated with a reliance on rain-fed subsistence agriculture is found to be exacerbated by the changing climate experienced by participants. Declining and increasingly unpredictable seasonal rains have undermined the sustainability of subsistence agriculture as a household food source, *"Now rainfall seasons are only twice a year and that was what communities were saying, 'This is great but our biggest food insecurity is coming from not knowing when the rain is coming'" (Participant 201)*. Indeed, a changing climate was directly linked to community-level changes in food utility, resulting in reduced food security: *"[The climate] had whittled down what originally was a lot of diverse indigenous crops into the very basic ones which were a lot more resilient to climate issues" (Participant 201)*.

Government Capacity - government institutions are integral to the socio-ecology of rural communities, they can act as a key structural source of socio-economic resources. However, findings showed that government capacity to act as a protective factor is not assured. Bureaucratic inefficiencies in local government activity delayed household access to much needed social protection, such as housing: *"To get a house it is not very easy because according to the means testing I qualify but I don't have one" (Tshegofatso)*. Access to welfare grants has also suffered: *"There are quite a few people that aren't receiving any grants because of paperwork issues" (Participant 201).* It is also important to remember that child support grants received by

participants are only R450 per month per child. So, despite the existence of social welfare mechanisms households have remained below the poverty line and more vulnerable.

Apparent inequity in government interventions is highlighted by Participant 201: *"There is a lot of focus on women but it doesn't seem to benefit the most vulnerable. It seems to benefit those that are already resourced enough to have a garden themselves and running water" (Participant 201)*. Key informant experience also highlighted the general limitations of government support capacity, *"People didn't know what to do so people were just giving up, there was no support. The Department of Agriculture extension officers aren't helping at household level, they are not going into the houses to train" (Participant 201)*. Or even antagony stemming from outdated practice: *"What we [CSO] were finding was that we were going in and saying, 'Ok, use this crop near this one to keep pests away', but then the agricultural extension officers were saying, 'spray with this'" (Participant 201).*

Insecurity, Inequity and Inadequacy in Community Capacity - findings also suggested vulnerabilities in community-level structures. Inadequate capacity of formal community resources was found to have negative consequences. *Rethabile* explained that her household was denied access to community-led food security projects because she started receiving an old-age grant from the government, "*My grandchildren, they were once part of Baloyi Trust [run by Induna] so they are no longer, they don't eat there because they say that because I am receiving a grant they don't want them there" (Rethabile)*. Importantly, the old age grant was not sufficient in ensuring household food security, leaving the household less well off. *Lesedi* found that the lack of community capacity forced community leadership to adopt harmful behaviours, undermining mental health and preventing intra-community support: *"Sometimes they [Induna] are good for mental health, but sometimes they are not. Sometimes when they are at community gatherings they will say community members are unable to assist people that are receiving child support grants" (Lesedi)*. Beyond potentially harmful behaviours, key informant interviews highlighted that community leadership was often in absentia and this absence of community leadership resulted in the failure of local capacity building projects: *"A lot of them [communal projects] fail because if you didn't have long term mentorship and support then whether it is internal politics, or one thing goes wrong and everyone just gives up" (Participant 201)*.

Local participants also experienced communal insecurity eroded the potential and sustainability of local capacity building projects. Criminal activity born out of local vulnerabilities, inequalities and a lack of communal efficacy were particularly damaging:

"There was a place where there were chicks and we could look after them until they were big to sell. The problem was that when they were ready to sell people go there and they break and steal. So the community, we're no longer doing it because of theft" (Omphile).

5.1.2 COVID-19 as Food System Stressor

Impact of COVID-19 on Economic Access to Food - the introduction of COVID-19 restrictions in South Africa has significantly influenced local economic resources. Most evidently, COVID-19 has caused a dramatic increase in unemployment. From interviews with local participants, COVID-19 has directly caused redundancies, *"My husband was a security officer, so since COVID they've replaced him… the restrictions stopped him working straight away" (Amogelang)*. COVID-19 has also restricted opportunities for those seeking work, *"Before COVID-19 it was easy to get a job, seasonal jobs. Now it is very difficult to do because the farmers are picking, they are just picking a few" (Karabo)*. Increased unemployment has reduced household income; six households experienced significant decreases, for example the household incomes of both *Ofentse* and *Kamogelo* halved. Economic access to food has therefore become increasingly difficult for many participants: *"Before COVID it was better because we wouldn't sleep without food, now it is difficult because we can pass some days without a job" (Tshegofatso)*. *Lethabo* noted a similar experience, she is unable to access basic needs because her husband, the main source of household income, is working far fewer hours.

Exacerbating the reduced economic access witnessed, food prices experienced inflation. Participants were unable to buy the same quantity of food as before COVID-19, increasing the risk of food insecurity: *"Food is very expensive nowadays… when I was buying mielie meal I was buying 50kg, now I am buying 25kg. The money that I have is limiting me by 50 [%]" (Karabo)*. In addition, COVID-19 restrictions have disrupted the government welfare grant mechanism, resulting in further access difficulties: *"They used to get it on the 1st of every month. But now they are being categorised into three groups. The first group is the old age, the second is the disability grant, then the child support grant" (Omphile)*. For recipients in the most common third category, money is not received until around the 6th of the month. Participants reflected that foodstuffs in limited monthly supply, such as meat, are thus inaccessible.

Impact of COVID-19 on Physical Access to Food - COVID-19 also had a significant impact on the ability of participants to physically access food. Legal restrictions that limited movement prevented normal patterns of market access, *"I only go once or twice per month because there are*

restrictions. I don't like to go often as before, before I could go anytime" (Omphile). This experience was echoed across most participants. On the other hand, a couple of participants experienced no change in market access as essential travel remained legal, implying that the apparent change in market access depends on a contextual comparison of their own behaviours both pre- and post-COVID-19. For example *Lethabo* noted, "*Going to the market is not a problem. I am still able to go to the market as I need" (Lethabo)*.

Nonetheless, COVID-19 restrictions increased wider barriers to formal market access; transport has become increasingly expensive and this presented a significant opportunity cost compared to before COVID-19, *"It is far to go to the market to buy groceries, I end up paying R50… It is not easy, because the amount that you have you also have to catch a taxi" (Rethabile)*. As well as this, physical mask wearing restrictions were commonly cited as a reason for avoiding physical market access: *"It is very difficult, even now the masks it doesn't make me breathe very well. It is why I don't want to go outside of my household" (Karabo)*. Significantly, it is not just legal restrictions that limited both informal and formal market access. Fear, caused by perceptions of COVID-19 as a dangerous disease, changed typical behaviours. Therefore, despite essential travel remaining legal, market access decreased: *"I no longer go to town [formal market] because there are a lot of cases of COVID-19" (Kamogelo)*; *"People are afraid to come to the household [informal market] to buy veggies and other stuff" (Ofentse)*.

Finally, eight of nine households previously relied upon SFPs as a food source. With the closure of schools under COVID-19 restrictions participants SFPs were also suspended, *"We're no longer receiving food, when it is closed there's no food that we are receiving" (Tshegofatso)*.

Impact of COVID-19 on Food Availability - COVID-19 restrictions were also seen to have a negative effect on food supply, the most visual outcome was participant experience of changing or reduced stock availability at both formal and informal market places: *"For spinach now it is not easy to get it in the [formal] market" (Lesedi)*; *"We are just stocking less [within informal spaza shop], and also not stocking some items" (Ofentse)*. However, perhaps the more worrying side-effect of COVID-19 restrictions found was the increasing scarcity and expense of seeds. Without ready availability of seeds, participants experienced a knock-on decline in food security through a reduced ability to grow food for household consumption, *"The problem is that the seeds they are hard to find. So it makes it difficult to plant some veggies" (Lethabo)*.

Moreover, the experiences of both *Tshegofatso* and *Karabo* show that informal food market supply has also deteriorated. *Karabo* linked this as a further consequence of seed unavailability as she grows vegetables in her garden for the informal market. The absence of seeds

has stopped this supply, *"If I don't get seeds then I will be unable to plant my garden for market" (Karabo)*. *Tshegofatso* was unable to supply the informal market as normal due to the opportunity cost of COVID-19 related stress on the household food system: *"We have planted indigenous crops but we are not looking for so much money as we need it to survive here" (Tshegofatso)*. Consequences of declining informal market supply were illustrated by *Rethabile*, who noted that villagers were no longer selling vegetables locally and she was therefore forced to buy from the formal market. Declining food security due to reduced availability was explicit when she stated: *"Buying from the [formal] market is harder and more expensive" (Rethabile)*.

Impact of COVID-19 on Food Utility - due to the changes in both access and availability of food following the introduction of COVID-19, local participants have utilised what food they have differently. Many participants spoke of significantly changed diets, exclusively negative changes that decreased food variety: *"I am making the same menu now. If I had beans today I will also have beans tomorrow" (Lethabo)*. Meals also had lower nutritional profile: "*We are mostly eating mielie meal now" (Rethabile)*. On top of these dietary changes, households cooked smaller meals, *"I've changed the pot I am cooking with. I'm using a small pot unlike the one that I was using before. So that I can save food" (Amogelang)*. Or participants have skipped meals, *"We used to eat three times a day, but we're no longer eating three times a day. We're eating twice a day" (Lesedi)*.

5.1.3 COVID-19 as Community System Stressor

Erosion of Intra-Community Support - linked to the negative impact COVID-19 has had on both household income and food systems, a decline in intra-community support was also witnessed. Participants found themselves unable to offer or receive traditional aid: *"Before COVID we were assisting each other but now everyone is being occupied with their own problems. I don't expect any help from anyone because we're all going through a lot" (Ofentse)*. Congruently, the burden of intra-community obligations has risen. The increased death rate associated with COVID-19 has raised the financial requirement of burial society membership, which was common across all participants as a result of socio-cultural norms: *"During this COVID it is difficult, people are dying. In the community we have to contribute a certain amount of money when someone passes away. Now I have some difficulty… I have to pay for their funerals" (Rethabile)*.

Legal restrictions have also prevented the normal function of community-level social groups and activities that provided socio-economic benefits. For example, local ladies groups that

would usually have allowed the pooling of labour and household goods were suspended, *"We are no longer able to meet, we're no longer able to assist each other because of the COVID restrictions" (Lesedi)*. The likelihood of intra-community support being offered has been further undermined by social distancing restrictions and fear: *"People don't want to help people outside of their household because they are scared of COVID-19, they are scared of catching COVID-19... The restrictions say you must keep social distance" (Karabo)*.

COVID-19 Impact on Mental Health - declining mental health among participants was another significant finding of this research study. Unfamiliarity with both physical and social restrictions was problematic and caused hardship: *"The restrictions were hard, they made me feel bad because you couldn't do normal life" (Rethabile)*. Social restrictions contributed to feelings of isolation among many participants, *"I feel as if I'm alone, because there is no help and it is very hard. Life is very hard" (Lethabo)*. On top of this, participant's often exhibited fear of COVID-19. All participants spoke of the 'danger' of COVID-19, how it can 'kill' you. Feelings of fear impacted mental health, *"My mental health is not well because I am always scared of COVID. Where I am staying lots of people have passed away because of this virus" (Ofentse)*. In combination, physical restrictions, social restrictions and fear of COVID-19 have burdened participants with significant mental stress, overwhelming households: *"Mentally I'm not well, always I am worried… There are a lot of difficult things so it is too much for me" (Lesedi)*.

Restricted Function of Informal Sector - as we will see in 'Pre-COVID-19 Protective Factors', the informal market is fundamentally important within the household and community food system; however, COVID-19 has had a damaging effect on the function of the informal market in a number of key ways. Firstly, COVID-19 restrictions prevented access to and employment within the informal market as a source of household income: *"Before COVID-19, by that time I could get some money to buy enough food because I was selling to the community. Now there is COVID-19 restrictions I no longer move around the village to sell stuff" (Karabo)*. Thus, impacts of informal sector restrictions were strongly linked to worsening economic access to food through declining household incomes. For those that were able to continue to operate within the informal sector, COVID-19 dramatically reduced demand for goods, *"I still can sell but not as much because most people that were buying are not working now… We are not stocking the same as before COVID because people don't have the money to buy" (Ofentse)*. The influence of COVID-19 on the informal sector shown within this section is on top of the previously discussed changes in food availability, caused by both the reduction in seller production and physical access to the market.

Weakening of Community Leadership - local participants gave many examples of the absence of support from community leadership throughout the pandemic. For example, *Tshegofatso* notes: *"[Induna] promise there will be food parcels that will be given to the people that doesn't work or are unable to buy food for themselves but they have never received anything from them. It is just an empty promise" (Tshegofatso)*. The absence of support from community leadership was directly attributed to COVID-19, *"They [Induna] are not able to help as before because of COVID, the restrictions stop them" (Ofentse)*. Some participants understood this, *"I understand why, as they [Induna] are in the same environment they don't know how to assist them because COVID has taken place" (Amogelang)*. For the most part however, the absence of community leadership support was in sharp contrast to the expectations of local participants, *"I feel that they should intervene as they are leaders in the community" (Tshegofatso)*.

Reduction of Government Capacity & Social Welfare - government capacity and social welfare schemes have been undermined by COVID-19. Government-led SFPs were suspended under COVID-19 restrictions; further burdening the household food system, *"This is very bad, now we have to find more food for ourselves. The children are no longer eating some food at school. And now they can't bring any food home to help, any uncooked food" (Karabo)*. Additional welfare grants of R500 brought in during COVID-19 to increase household income and maintain food security were also suspended in October 2020, despite the continuation of the COVID-19 pandemic and food insecurity caused by accompanying restrictions: *"At first it was not difficult because the grants had been increased. But now the grants have been taken back… So now we are experiencing a little bit more trouble in buying groceries" (Rethabile)*. Direct food aid was also in short supply, *"The food parcel relief that was accessed through the work councillors, I registered to apply for it and the first group got the food, but I was on the second list and the second list didn't get the food" (Kamogelo)*. Findings therefore suggested obvious limitations in government response capacity. Key informant interviews highlighted that low government capacity is explained by unpreparedness and the huge national level spending required to directly combat the COVID-19 health pandemic:

"We work closely with the Department of Health specifically and of course they had their absolute hands full… their [local government] capacity through COVID has been somewhat reduced to deal with everything… Funding would've been great and it was a stretch to get funding available. But any bureaucratic system is not designed for this kind of emergency response" (Participant 201).

Deterioration of CSO Capacity - CSO capacity to maintain food security and community resilience has deteriorated due to the COVID-19 pandemic. Issues of access were acknowledged by local participants, *"It is harder to meet them [CSOs] because of the restrictions and so I'm not involved with them" (Tsehgofatso)*; and by key informants: *"The restrictions, we didn't want to go anywhere, you can't go into the villages" (Participant 202)*. Issues of access manifested into delayed or reduced aid: *"The food parcels that I received is not the same as before COVID. It's changed when I get it, it takes some time for me to get it" (Lethabo)*.

Both local participants and key informants also noted that capacity building activities such as training programmes were suspended or limited, "*It has changed a lot, because the trainings are less. We used to learn a lot of stuff from [CSO]" (Karabo)*; *"So we paused our trainings, all group activities from about March/April till about October. We made all those groups smaller and had to find very ventilated venues. So instead of 15 to 20 in a group we'd have 10" (Participant 201)*.

Insufficient Information & Communication - the COVID-19 pandemic has diminished the function of existing information and communication networks. Within the community, social restrictions stopped face-to-face communication pathways, *"It is not easy because we are on level three restrictions. You are not supposed to go to visit other households, as I am staying at home I won't be able to know the whereabouts of the community" (Amogelang)*. Community meetings that previously acted as important pathways to share relevant local information, led by community leadership, were also suspended, *"Now they are no longer giving them any information" (Karabo)*. Instead, participants relied on regional information sources, *"There was no one local who taught her, for her to get information it was through the radio" (Tshegofatso)*. Congruently perhaps, a lack of community-level information resulted in non-compliance with COVID-19 restrictions, or more general misunderstanding of rules, *"At first I could see that people were not complying" (Ofentse)*; *"Social distancing we even maintain it at home, the whole family sitting at home we continue with it" (Lethabo)*. Additionally, local participants highlighted a distinct absence of any information related to the maintenance of food security, *"There has been no one that has shared anything about food security" (Tshegofatso)*.

5.2 Protective Factors

As per the second sub-objective of this research study, community-level protective factors will be presented. In this section 'Pre-COVID-19 Protective Factors' are presented; followed by 'Coping and Adaptation Strategies' utilised to maintain food security.

5.2.1 Pre-COVID-19 Protective Factors

Positive Household Characteristics - despite apparent vulnerabilities, positive household characteristics that promoted resilience and food security were also seen. Rural geography, while linked to some vulnerabilities, did enable common access to agricultural land suitable for subsistence agriculture; seven of nine households owned food gardens. Food gardens were commonly recognised as important household resources that provided food security; having positive effects on food access, availability, utility and stability: *"The garden is very important in growing food for the whole family, for not having to buy food. You can grow enough food for a big family like mine" (Kamogelo)*. Nutritional diversity was attributed to food gardens*, "I'm growing oranges, naartjies, bananas, avocados, spinach, tomatoes, onions" (Lethabo)*. Fundamentally, key informant interviews oriented the success and feasibility of food garden projects around rural geography, *"We weren't talking about people that were living in a block of flats and hadn't grown anything in their lives. We were talking about rural communities that have history with planting and having communal and home gardens" (Participant 201)*.

Many positive household characteristics were shown solely by *Ofentse* whose household was perhaps the most food secure before COVID-19 and did not experience food insecurity. A number of factors accounted for this, firstly both adults in the household were economically active: *"We run a small business. My husband is running a [spaza] shop and I am selling vegetables from a wagon" (Ofentse)*. As a result, *Ofentse's* household monthly income before COVID-19 totalled R10,000, significantly higher than all other participants. Despite a significant drop following COVID-19, *Ofentse's* household income remained the highest due to continued economic activity. In addition, a low household dependency ratio of only 2:1 and ownership of savings and livestock increased household food security and potential coping strategies, *"We are saving money, we also have goats but less than 10. We get milk from our goats and sometimes meat… We could sell a couple of goats" (Ofentse)*. Beyond *Ofentse*, other tangible resources that contributed to increased food security included ownership of adequate housing and household appliances; fridges in particular enabled long-term food storage.

Role of the Informal Sector - the informal sector was oft cited as a protective factor that enabled households to overcome issues associated with inadequate formal employment and low household income. The informal sector was found to facilitate agricultural vending and increased household income, reliant of course upon the ownership of agricultural land to engage in subsistence farming, *"Before COVID-19 the food security was going well because I could plant and sell" (Tshegofatso)*. The informal sector also provided important non-agricultural employment opportunities that sustained households: *"Before COVID, it was easy for me to get some small jobs. Because I was moving around the village – they would call me to wash clothes and give me money" (Amogelang)*. As well as increasing household incomes through the provision of accessible economic activity, the informal sector presented as an important community-level food source that maintained easy food access and increased availability. For example, *"For veggies there are people in the community selling it from buggies" (Rethabile)*.

Community Membership - membership, through socio-cultural bonds and community involvement afforded protective factors. Participants showed a strong attachment to place; the idea of community was very important for many participants, the following definition of community was typical, *"When you say community you are referring to the people that you are staying with in that area" (Ofentse)*. Many participants took this further and linked community to a shared ideal or motivation, *"For me, community we are working together in unity so that's how the community operates" (Lesedi)*. Upstream ideals related to community membership appeared to encourage intra-community support, *"Community is more important to me because whenever I have a problem then the community members can come to me and they can help me. We are all together in one area so can help" (Kamogelo)*. Physical manifestations of this apparent sense of community were common, for example: *"My neighbours and people that I live with could [before COVID-19] share veggies, help with cooking or labouring" (Omphile)*.

Membership was generally evidenced through examples of participation in community groups or institutions. High participation was the norm, attendance of the local church and ladies groups were common: *"I am a part in the community, I go to the local church in the community. When there is a meeting in the Induna's [community leadership] I attend. I'm also part of the working ladies group" (Ofentse)*. Two functions of community groups and institutions were found. Firstly, they acted as sources or enabling sites for social capital, *"The groups were helpful. They were helpful as people helped each other and you could ask for help, talk to people" (Tshegofatso)*. More tangibly, membership of and participation within community groups directly

led to socio-economic benefits, *"I am part of the ladies group. This ladies working group we are saving money. When there are issues, maybe when there is a problem at home, they withdraw that money and bring it to your household" (Omphile)*. Similar benefits of burial societies and Village Savings and Loans Associations (VSLAs) were referenced. Finally, community membership provided access to communal resources, *"There is land outside the village if you want to plough you can go and do your things and then use it" (Omphile)*.

Community Leadership - somewhat linked to the theme of 'Community Membership', community leadership did provide advantages despite capacity limitations. Key informant interviews showed that community leaders can provide a link between community and government, leveraging local capacity building: *"They're the access to the municipality… they motivate what comes to the area, they are the ones that know what the Department of Agriculture, what opportunities there are. They do wield political power as a group". (Participant 201)*. Participant experience also framed the Induna as a valuable linking resource, many spoke of relevant information being disseminated through community meetings, *"They [Induna] have a cabinet, where those members are spreading the information so that community members will be able to receive it" (Tshegofatso)*. Descriptions of this 'cabinet' suggested a somewhat bureaucratically competent institution, supported by participant responses that framed communication as 'two-way'. Participants were able to easily seek information or assistance, *"If there are issues or problems that need the Induna's attention I can go, I can walk to them. It is not far from where she is staying" (Omphile)*. This was also possible via phone. Actual benefits to community food security were indeed accrued by community leadership actions, examples covered the provision of seeds, housing support, financial assistance and food aid through local projects. For example, *Lesedi* was referred to the local NGO, *"The community cabinet referred me so I was able to receive groceries on a monthly basis" (Lesedi)*.

Government Social Protection - the presence of government-led social protection and welfare, although in some cases insufficient, did also provide an essential lifeline for many rural households. Many households had a high dependence on welfare grants that provided essential household income and maintained food security: *"We are depending on the child support grants of the four children" (Kamogelo)*; *"Child support grants is the main source of surviving" (Karabo)*. Variations of 'depend' and 'survive' were common. All nine households also received food from government funded SFPs, another key social protection scheme. SFPs reduced stress on the household food system and decreased the quantity of food needed to be provided at home,

"The children were receiving food from the feeding programmes. It was very important and during lunch they will get a lunch from school then they will also eat in the evening when they have reached home" (Lethabo). Additionally, *Amogelang* and *Tshegofatso* have both benefitted from government housing. Finally, key informants acknowledged that many CSO capacity building activities leveraged government support, *"We do work closely with the government. What we did get is about R50,000 for the herb garden from the Department of Agriculture, they gave us some seedlings" (Participant 202)*.

CSO Activity - CSO activity within Mopani District was extensive and acted as another significant protective factor that maintained food security. Prior to COVID-19, CSO activity in GTZ took many forms. Direct health based service delivery improved community health capacity, *"We have about 9-10 clinics doing primary health care services like HIV, TB and diabetes. All chronic medication" (Participant 202)*. CSO-led direct food aid also helped maintain community food security, *"The food that I was getting from [CSO] was groceries like mielie meal, sugar beans, tinned fish, cooking oil, bathing soap, washing soap, veggies, 7kg potatoes, pumpkins, cabbage, onions and tomatoes" (Lethabo)*. Distribution of seedlings was another common service identified.

Importantly, CSO activity also focused on improving household and community capacity to ensure sustainability and long-term resilience. This included improving local knowledge and empowering self-adaptation, *"I think resilience is a word that has come through for us in our last strategic plan… we said, 'ok no', we are looking at empowerment and long-term impact" (Participant 201)*. Extensive CSO training programs on sustainable agricultural practices and food nutrition have benefitted local participants; one CSO was found to offer a three day agro-ecology program covering organic climate-resilient planting techniques, water conservation and soil management. The project in the last year has involved 130 people, including *Amogelang* and *Omphile*, *"I was trained by [CSO] so it is something that I know, that keeps on going and planting my veggies so that I don't go hungry" (Amogelang)*; *"Food security training we were taught how to plant, how to control pests, how to do compost" (Omphile)*. Financial literacy programmes and business training has further enhanced both local capacities and financial literacy: *"There was a VSLA training where they taught on how to save money. At the end of the year we share the profit equally and do what we want… We were also encouraged to start our own business" (Omphile)*.

Finally, both key informants understood that CSO activity is enabled by funding from international governmental institutions, international non-governmental organisations and private donors; this leveraged funding should not be ignored as a protective factor.

5.2.2 Coping & Adaptation Strategies

Traditional Knowledge & Local Practice - locally embedded knowledge and practices afforded successful adaptation. Ownership of a food garden has been outlined as a 'Pre-COVID-19 Protective Factor', but it was traditional agricultural knowledge that enabled sufficient food production to support households: *"I know how to make compost and plant my veggies, and to care for them until I can eat" (Amogelang)*. Many participants spoke of bountiful yields, a by-product of traditional knowledge, *"My garden is fruitful. The spinach, the leaves of the spinach are like my arm" (Omphile)*. Accordingly, many households were able to maintain food security, *"On the food security side, I won't say I have a challenge because I have grown the vegetables that I have the seeds with me. So the veggies, I have them and I'm eating" (Lethabo)*.

Traditional knowledge was also highlighted through the use of seasonally available indigenous crops to support food security. Participants explained that indigenous crops are easier to grow, many occur naturally and do not require the purchase of seeds, *"The indigenous crops if you just plough the whole yard they are the plants that naturally come up" (Lesedi)*. Local dietary staples such as maize and sugar beans were categorised as such, compared to crops like cabbages and tomatoes more typically sold for income generation, *"I didn't plant spinach or all those sort of things, I planted indigenous crops inside the garden. They are easy to grow and we can make the mielies and other food for the household, like beans" (Tshegofatso)*. Traditional knowledge of food preservation also contributed to the long-term maintenance of household food security: *"The knowledge from growing up, that the veggies we have we boil them up, put some salt and let them dry in the sun. Then put them in a container so we can eat them next time" (Kamogelo)*. Other behavioural changes were also evidenced as local purchasing patterns shifted to cheaper long-life goods, *"I buy tinned stuff which lasts longer before you have to use it" (Lesedi)*.

Intra- and Inter-Community Support - despite the erosion of household and community capacity under COVID-19 restrictions, networked community resources were important. Many participants continued to offer and receive food assistance, *"When they [neighbours] look they can see that I don't have it they share it with me. When I look to my neighbour they doesn't have something I do share with the neighbours" (Kamogelo)*. Enacted intra-community support positively benefitted mental health, *"I feel very well that my neighbours and friends are assisting me" (Rethabile)*. Intra-community capacity building also continued, adapted to COVID-19 restrictions. One participant explained that members are continuing VSLAs to maintain future income generation:

"*It is no longer easy as before, but we are trying not to stop. We just follow the COVID restrictions when we are there" (Omphile)*.

Inter-community networks provided access to external capital resources. Financial or food donations made by high-income communities to low-income rural communities through CSOs were one example - one CSO received over R1 million: *"We were able to tap into different community resources, in the local community, the Tzaneen community were saying, 'What can we do to help, here please buy a food parcel for a household'" (Participant 201)*. Moreover, network links between CSOs, seasonal farm workers and local villages helped overcome issues of food aid distribution:

"There are almost 15,000 farm workers in a season and it was easy because they are going home by buses. So we just gave it [food] to them, otherwise it would be too expensive. Sometimes some of the farm workers would ask friends to bring their vehicles and then we distributed through that" (Participant 202).

Informal Sector Activity - participation within the informal sector during the COVID-19 pandemic enabled some local participants to maintain food security. Informal market food supply has mitigated psychological barriers to formal market access, local markets were perceived as safer, *"I would rather buy from the local places so I don't get it [COVID-19]" (Kamogelo)*. More importantly however, selling produce through the informal sector provided vital household income, *"I am planting sweet potatoes in my yard and selling, I'm planting veggies in the garden and selling mopane worms and sugar beans" (Karabo)*. *Ofentse* spoke of being empowered by the informal sector during COVID-19, informal sector activity lessened household dependency on formal employment, community support and social welfare: *"I don't expect any help from community. What I am doing is selling my veggies, the spaza shop at home. I am helping myself" (Ofentse)*. Additionally, the informal market provided an outlet for local entrepreneurial skill. Key informant experience showed the emergent engagement in income generating ventures: *"People would do the training and wouldn't start businesses, but now people that hadn't really started their businesses have re-started them. It's the same with our other income generating strategies" (Participant 201)*. *Ofentse*, as an example, adapted to informal sector restrictions and local realities to overcome market barriers:

"I was able to apply for a permit to go and buy tomatoes and onions so I was hooting [hawking] in the streets to sell veggies… People are afraid to go to the household to buy veggies and other stuff, so I have to take a buggy and hoot [hawk] on the streets" (Ofentse).

Government Social Protection - the continuation and introduction of more extensive social welfare mechanisms was important to the experience of food security. COVID-19 welfare grants for low-income households introduced by the South African Government provided extra income, utilised by local participants for maintaining economic food access. When asked how COVID-19 had changed household food access, *Kamogelo* responded by saying: *"On the social grant side, it is better. Because I am still receiving that amount and previously we were given an extra amount on the grant" (Kamogelo)*. It should be noted that these additional payments were suspended in October 2020 despite the continuance of restrictions. However, the ongoing provision of welfare grants was shown to be essential for rural households, *"We are coping because we are still getting the same grant money which is enough to buy food" (Omphile)*. Ongoing dependence was highlighted across eight of nine participants.

CSOs as Community Resource - both key informant and local participant interviews spotlit the role of CSOs as major community resources, covering the obvious shortfall in government capacity, *"I think what government did, I think we were a resource to them rather than the other way around" (Participant 201)*. Extensive food package projects were initiated to support household food access: *"Almost 6,700 food parcels that we distributed through the last year". (Participant 202)*. Crucially, CSO-led food projects supported adequate food utility, improving the nutritional profile of local diets: *"We have our list [of groceries for food parcels] that we share with other organisations so that we are constantly looking at what is most effective for the highest nutrition" (Participant 201)*. CSOs have improved physical access to food through direct home delivery services, *"They [CSO] were willing to distribute to shacks, you know people that are in informal settlements. So they were helping distribute food to different people" (Participant 202)*. Value of CSO activity was commonly echoed within local participant experience: *"Because we can't afford to buy much food the packages mean we get at least enough food to live" (Karabo)*.

CSO activity was not just limited to food aid, adaptation training proved important: *"We are being taught how to save some of the seeds to use on the second season" (Omphile)*; continued capacity building projects have also contributed to continued food security:

"The mentorship continued over that time though. We did some telephonic, because our training is very linked to our mentorship… So at the beginning we moved into telephonic mentorship. So our mentor would phone and say, 'How's this going, how's this going? What are your challenges, have you thought about this?'" (Participant 201).

Information & Communication - information and communication across the village ecosystem was the final key protective factor found. Intra-community communication was largely maintained through the use of mobile phones, phones allowed local participants to maintain essential communication networks: *"We were telephoning and updating each other, as we were not allowed to meet in one place" (Lethabo)*. Benefits of this communication were two-fold. Firstly, it provided a shared sense of community experience and mutual understanding: *"Knowing what is happening in other communities, it is not only our community. Other communities are experiencing the same so we're sharing, it stops me feeling isolated because it is not only us" (Ofentse)*. Secondly, communication with fellow community members greatly improved mental health and reduced feelings of isolation, *"It is very helpful, as my state of mind is well and getting better because we are still in contact with the people that care about us, that love us. That we are to meet at least by phone" (Tshegofatso)*.

Beyond intra-community communication pathways there were a number of sources that did disseminate essential information, somewhat contradictory to participant experience that highlighted information insufficiencies. CSOs were one example: *"We did a full SMS campaign passing on information and resources. So yes, we've been doing what we can to try and combat the misinformation" (Participant 201)*. CSOs as information sources was acknowledged locally too: *"I get the information from the [CSO] staff, the staff are supporting me" (Amogelang)*.

Media broadcasts, local health clinics and community leadership were all further sources of information. For example, community leadership showed flexibility in information delivery, *"The information that I'm getting is from the Induna's, they go with their car in the street and say, 'Don't forget to wash your hands, wear a mask and sanitise'" (Ofentse)*. Information providers took advantage of extensive radio ownership and mobile phone penetration as COVID-safe dissemination pathways, *"The information I'm getting as I'm listening to radio and watching TV" (Kamogelo)*; *"I've been receiving SMS every day [from government] to warn and teach about COVID-19… everyone has a mobile phone so it is easy for people to receive the information this way" (Lesedi)*. The range of sources resulted in many participants claiming information sufficiency, most participants complied with restrictions which indicated understanding: *"The information I have received is full and I am following it" (Kamogelo)*.

6. Discussion

In this chapter, the impact of COVID-19 as a stressor on food security in Mopani District is explored through the FAO's Four Pillars framework, relating the lived experience of participants

against existing literature. Following this, the findings are discussed in relation to the theoretical framework of Community Resilience; orienting the impact of COVID-19 on food security against the four adaptive capacities of: Economic Development, Social Capital, Information and Communication and Community Competence (Norris et al., 2008). Once again, it is important to be reminded that this study understands the interconnected nature of individual resilience and community resilience. Finally, across the literature, vulnerabilities are not distinct from protective factors as adaptive capacity is an outcome of their antagonistic relationship (Boon et al., 2012; Cutter et al., 2008; Norris et al., 2008). It is therefore proper to discuss both in this section. Some key learnings for the Community Resilience framework are also explored.

6.1 COVID-19 and the Experience of Food Security

Participant experience in Mopani District has stressed the detrimental effect COVID-19 has had across food security outcomes, primarily from the impact of the mandated national lockdown (27th March 2020 – 1st May 2020) and range of restrictions ongoing throughout the phased re-opening (1st May 2020 - Present). The following section of this chapter analyses the impact of COVID-19 using the FAO's Four Pillars framework. Food stability is not addressed separately defined as it is by the relationship between access, availability and utility over time.

6.1.1 Food Access

Economic access to food is of particular concern. Reduced household income is attributed within the findings to severe wage reduction and high formal and informal sector unemployment levels. This is directly in line with empirical evidence emergent in South Africa and echoes wider SSA case study and global-level scenario analyses (Arndt et al., 2020; Iwara et al., 2020; Kansiime et al., 2021; Laborde et al., 2020; Visagie & Turok, 2020). Not yet appraised elsewhere in the literature however is the worsening of economic access to food caused by COVID-19's influence on the South African social grant mechanism as delays in the actual receipt of monies are preventing access to high value foodstuffs in limited supply. Declining household income has coincided with rising food prices further disenabling many from typical economic access; rising food prices present a particular problem to low-income households because of the high proportion of income that is spent on food (Baipethi & Jacobs, 2009). Erokhin & Gao (2020) empirically assessed that this effect is less perceptible in upper-middle-income countries, like South Africa (World Bank, 2021). Findings suggest however that contextual sub-national inequities must also be taken into account, national-level analyses do not fully capture local experience.

Physical access to food has not escaped the influence of COVID-19 either. Study participants raised concerns regarding legal restrictions on movement, geographic distance to markets, transport expense and availability. Iwara et al. (2020) similarly found that rural community members in Vhembe District (Limpopo) experienced a mix of legal and socio-economic barriers to food markets. Additionally, this study found that intangible barriers, such as fear of COVID-19 transmission, prevent market access. Intangible barriers have not yet been discussed elsewhere in the literature, excluded perhaps by the rigid nature of quantitative surveying and modelling undertaken so far (Arndt et al., 2020; Nechifor et al., 2021; Visagie & Turok, 2020) Yet, the severity of food market barriers is contextual as some participants experienced no significant issue – this lends credence to individual-level differences in resilience capacity which will be explored later. However, across the literature and study findings a common theme is the negative impact the suspension of SFPs has had on physical access to food (Paganini et al., 2020; Van der Berg & Spaull, 2020). Van der Berg & Spaull (2020) highlight that SFPs are crucial sources of food for children from low-income households in South Africa, the knock-on effects of continued suspension include severe child malnutrition. Effects of COVID-19 related food insecurity could therefore be seen for years to come.

6.1.2 Food Availability

COVID-19 restrictions have also influenced supply-side realities of the local food system in Mopani District. Across both local-level empirical literature and hypothetical scenario analyses COVID-19 restrictions are shown to have a disastrous effect on food availability; trade restrictions, transport disruptions and general agricultural production shortages drastically reduce formal market food supply (Devereux et al., 2020; Erokhin & Gao, 2020; Iwara et al., 2020; Laborde et al., 2020). While there is some evidence of this in the findings, it was few and far between and certainly not as severe as illustrated elsewhere. Most participants reported either no change or slight variations in food availability, perhaps linked to the abundance of the 2020 South African harvest and protection of the formal agricultural sector during COVID-19 (FAO, 2020; OECD, 2020). Concerns are therefore raised for the delayed experience of food unavailability over the coming season. Pre-existing food security issues, such as the traditionally poor diversity of local diet in Limpopo as a consequence of access and utility constraints, may also account for the experience of food availability (Labadarios, Steyn & Nel, 2011). Perceptions of availability are influenced by pre-event function, that participants were still able to buy a limited range of low-value agricultural products should not necessarily be celebrated.

However, issues of food availability within this study are more explicit when assessing the scarcity of agro-inputs at community-level and the resultant effect on informal market availability; something not yet empirically assessed within South Africa - although Zimmerer & de Haan (2020) find similar seed shortages through case study analysis of rural South American communities. Seed is an essential agro-input for community-level engagement in subsistence agriculture, an important source of both household food consumption and informal food market supply. The decline in informal market supply has forced consumers to rely on higher priced and more inaccessible formal market sources, further exacerbating issues of food access.

6.1.3 Food Utility

COVID-19's impact on food utility is dualistic. Firstly, issues of access and availability are not equal across food types; globally, food types with lower nutritional value have remained more accessible and available (Akter, 2020; Yu et al., 2020). Notably, Pereira et al. (2014, p.342) argue that a "nutrition transition", occurs among rural low-income communities when food access and availability are restricted. This 'transition' favours cheap low-nutrient foods easily bought and stored in bulk, an effect also witnessed by Mkhawani et al. (2016) who found a similar reaction in Mopani District under general food price inflation. Participant experience has highlighted a shift in diet towards an increasing reliance on maize meal and a limited range of other food types, including a greater use of less nutritious tinned food. COVID-19 has thus compounded pre-event utility issues as Labadarios, Steyn & Nel (2011) and Van Averbeke & Khosa (2007) have already explored key macro- and micro-nutrient deficiencies resultant from poor diet in Limpopo. Typical rural dependence on subsistence agriculture commonly results in protein, iron, vitamin A and vitamin C deficiencies (Van Averbeke & Khosa, 2007).

Secondly, pursuant to the declining accessibility and availability of food, participant experience shows individuals skipping meals and cooking smaller meals. This study therefore adds necessary empirical support to the hypothesis of Béné (2020, p.809) who argues local food system resilience to COVID-19 would be undermined by "bad" practices, or negative coping strategies. The adoption of negative coping strategies further increases the risk of long-term consequences from malnutrition and is indicative of inadequate adaptive capacity. Importantly, empirical evidence emergent in Kenya has found the adoption of similar negative coping strategies among low-income rural communities (Kansiime et al., 2021; Quaife et al., 2020). The transferrable implication for Health Promotion practice therefore is that food utility issues under COVID-19 can be somewhat predicted across similar demographic populations.

6.1.4 Food Security, Health Promotion & Global Development

Findings show that COVID-19 has eroded all conceptual pillars of food security which is significant to both Health Promotion and wider pursuit of development. At the most basic level, both adequate food and income are identified as prerequisites for health in the Ottawa Charter (WHO, 1986). Both are again explicit within the SDGs, 'Zero Hunger' and 'No Poverty' (UN, 2015). The very apparent increased risk of food insecurity and malnutrition arising from insufficient food and income is widely associated with serious health comorbidities. Impaired physical and cognitive development, increased morbidities due to immunosuppression and increased mortality are commonly cited (Kimani-Murage, 2013; Martins et al., 2011; Mkhawani et al., 2016; Wang et al., 2016). As such, this study finds that a focus on the improvement of rural community members dietary quantity and diversity is much needed to promote health and development outcomes. Additionally, findings frame food insecurity as a multi-factorial and multi-sectoral issue, reinforcing the importance of 'good governance' across stakeholders as a core concept within Health Promotion (WHO, 2016). Issues across each pillar of food security encapsulate a diverse range of factors beyond the sole remit of the health sector, including education and income. Many different stakeholders from the South African Government through to private food retail businesses and schools are also involved. Linked to this, the importance of schools in the food system raises their value within a settings approach to health (WHO, 1986).

6.2 Community Resilience

In this section, the findings are discussed in relation to the theoretical framework of Community Resilience; initially as per key objectives of this study the importance of positive adaptive capacities at community-level are discussed. However, an important outcome of this study is the understanding of community resilience as a dynamic relationship between the system stressor, vulnerabilities and adaptive capacities. As such, caveats and learning outcomes relevant to the Community Resilience framework and Health Promotion are also included.

6.2.1 Economic Development

Natural Capital and Rural Food Security

Economic development as an adaptive capacity includes all available capital assets within the community; availability of natural capital that allows engagement in subsistence agriculture is perhaps the most important economic resource found within the findings. Framing subsistence

agriculture as a protective factor in rural food systems is nothing new, multiple food security assessments in South Africa highlight importance (Aliber & Hart, 2009; Baiphethi & Jacobs, 2009; Mbajiorgu, 2020). Even in post-COVID-19 literature importance is recognised. The argument has been made that subsistence agriculture builds independence from neo-liberal national and international food systems inherently more exposed to COVID-19's influence, making rural communities more resilient to COVID-19 shocks (Chiwona-Karltun et al., 2021; Clapp & Moseley, 2020; Erokhin & Gao, 2020). Congruently, ownership of land that enabled engagement in subsistence agriculture represented a significant economic resource essential to the pre- and post-event experience of food security, both in household consumption and informal market supply. A significant body of literature therefore holds that land reform that promotes subsistence agriculture through improved land access would foster food security (see Gumede, 2014; Lipton & Saghai, 2017). However, past South African land reform has marginalised women in favour of men (Thamaga-Chitja et al., 2010; Walker, 2009). As study findings place women at the centre of rural household subsistence food systems, the importance of land reform that also empowers women is clear. Advocation of equitable land reform, as a core principle of Health Promotion and example of both good governance and the Ottawa Charter action area 'Build Healthy Public Policy', could therefore maximise the *protective* factor of subsistence agriculture (WHO, 1986). Adoption of sustainable agricultural practices, synonymous with the targeted development of personal skills outlined in the Ottawa Charter, could also contribute to development and long-term health in rural South African communities (Abdallah et al., 2021; Adenle et al., 2018; Myeni et al., 2019; WHO, 1986).

Informal Economy vs. Formal Economy

The valuable role the informal sector plays within rural South African food systems is frequently analysed, raising both food availability and access (Skinner & Haysom, 2016; Tshuma & Jari, 2013). One could paint the informal economy in South Africa as antagonistic to community resilience, associated as it is with an inherently less robust nature and calamitous policy environment (Skinner & Haysom, 2016; Skinner & Watson, 2020). Vulnerability is obvious in post-event dysfunction as the informal sector stuttered despite government-level policies, such as sales permits, that attempted to maintain function (Ezirigwe et al., 2020). The dynamic relationship between stressor and adaptive capacity is also evident. However, this study frames the informal economy as an essential protective factor. In pre-event function the informal market provided an essential source of easily accessible food, a common finding across much literature and a key implication for policy (Misselhorn & Hendriks, 2017; Skinner & Haysom, 2016). But it

is in the apparent potential for informal markets to overcome emergent barriers to formal markets specific to COVID-19 that the protective factor of informal food markets is evident, namely the mitigation of transport barriers and fear of viral transmission.

Regarding economic access to food, formal sector activity remains structurally inaccessible to many low-income rural households due to bureaucratic, financial, geographic and educational barriers. The comparative ease of entry to the informal sector in pre-event function plays a significant 'equalising' role, improving economic equity and driving local economic development (Etim & Daramola, 2020; Sparks & Barnett, 2010). For example, in this study traditionally vulnerable black women from low-income rural communities were able to engage in informal economic activity that improved household income and food security. Notably, the informal sector also promoted system flexibility by providing a rapid alternative to formal market employment, an essential criterion within resilience theory (Norris et al., 2008). Some participants continued or initiated informal sector activities that generated income and maintained food security while formal sector opportunities vanished. Parthasarathy (2015) argues that the informal sector is essential to post-crisis recovery because of this flexibility, users are able to act independently respective to individual need. It is perhaps then the very absence of a restrictive policy environment surrounding the informal sector that can promote resilient outcomes following the introduction of a stressor. As such, safeguarding the informal economy could foster improved health equity and economic development in rural communities, in line with the Ottawa Charter action area of creating supportive environments.

6.2.2 Social Capital

Social Capital and Resilient Outcomes

Social capital forms an essential component of resilience analysis, defined as it is by the understanding that actual and potential resources are embedded in social networks; resources that can be mobilised to improve adaptive capacity and community resilience outcomes (Aldrich & Meyer, 2015). The concept of social capital is also significant to Health Promotion, understood as a facilitator of positive health outcomes (Eriksson, 2011; Ferlander, 2007). Next to economic development, social capital is most frequently identified as a protective factor within rural low-income communities in South Africa (Mbiba et al, 2019; Sharaunga, 2019; Sharaunga & Mudhara, 2021). Sharaunga (2019) for example, explores bonds of reciprocity, social support and trust among rural black women in Msinga, KwaZulu-Natal, as mitigating factors against low-income and food insecurity. Study findings prove very much in line with existing literature as food

'gifting' between participants allowed hitherto vulnerable individuals access to food both in pre- and post-event function. Other physical manifestations of social capital evident within the findings include shared labour, financial aid and social support through communication, the last of which is explored in detail later.

The dynamic socio-ecological relationship between adaptive capacities is also apparent as social capital is commonly associated with endogenous economic development. For example, higher social capital among rural communities in Kwa-Zulu Natal is found to both increase the adoption of sustainable agricultural practices and foster entrepreneurial drive (Chipfupa & Wale, 2018; Thamaga-Chitja & Tamako, 2017). In this study, membership of working groups and VSLAs promoted entrepreneurial capacity building, high social capital in Mopani District should therefore be seen as a contributing factor behind local income generation. Thus, availability of social capital at community-level again supports the settings approach to health adopted by the WHO, as the village setting itself is health promoting (WHO, 1986).

Sources of Social Capital

But where does social capital come from and what sources have proved most important to community resilience? Theoretical literature frames social capital as a product of both informal sociocultural norms and formal societal structures (Boon et al., 2012; Cutter et al., 2008; Norris et al., 2008). Informal social capital in rural communities arises from the network of, "strong inter-personal relationships, with mutual obligations, expectations and reciprocity" (Tibesigwa et al, 2016, p.203). In this study, 'neighbourliness' and kinship were core concepts, with participants seemingly morally obliged to aid less fortunate community members; synonymous with the more collectivist nature of indigenous South African society (Eaton & Louw, 2000). Reciprocity also appeared to be a product of strong attachment to place and enhanced by mutual feelings of place beneficence, something again seen across existing literature (Cox & Perry, 2011; Guo et al., 2018). A key finding therefore is that informal social capital, a product of embedded socio-cultural norms, has remained largely unaffected by COVID-19 and remains a key resource for resilience and positive health outcomes. Informal social capital in this study is categorised as an example of "bonding social capital", defined as strong homogenous networks within a specific community (Ferlander, 2007, p.118)[4].

[4] "Bridging social capital", or heterogenous networks across external communities was not seen within findings so is not discussed, perhaps because of the geographic isolation of the rural community (Ferlander, 2007, p.119).

The COVID-19 pandemic is different to past stressors in South Africa in that social restrictions have largely prevented the operationalisation of formal social capital resources *during* the crisis as participant experience highlights the suspension of most groups and societies. Contextual antagony between COVID-19 and adaptive capacity is again seen, Harte et al. (2009) for example explore the positive influence formal community institutions *can* have during crisis response in South Africa. However, participation in formal community structures has nonetheless been found to promote bonding social capital in pre-event function (Pronyk et al., 2008; Sharaunga & Mudhara, 2021). Local participants actually defined community membership through examples of participation in womens groups, funeral societies, community meetings and the church. Notably, Pronyk et al. (2008) show social capital can be generated intentionally in South African communities through formal community structures. Moreover, formal community structures form important physical sites of social transaction; Sinyolo & Mudhara (2018a) for example link membership of farmers groups in South Africa to higher food security due to positive externalitites of co-participation. The ability of participants to seek help through community leadership, group or society membership in this study was not dissimilar. Thus, findings suggest that nurturing formal community structures enables the creation of a more supportive environment for positive health outcomes, essential in both achieving community resilience and long-term development.

Vertical inter-community organisational linkages between key stakeholders have also allowed access to previously unavailable external capital resources, increasing redundancy in community food systems. 'Loosely coupled' networks prove inherently more resilient to external shocks, as the diversity of stakeholders decreases susceptibility to system wide dysfunction, much like ecological systems (Norris et al., 2008). One method of achieving a loosely coupled network is through 'linking social capital', the conceptual understanding that community resources can be leveraged vertically between people of different socio-economic backgrounds within organisational structures (Sabatini, 2009; Woolcock, 1998, 2001). The Induna facilitating participant access to government resources is on example in pre-event function. Yet the importance of linking social capital is most evident in the experience of food security following COVID-19. Key organisational linkages with CSOs allowed higher food access, availability and utility. The apparent leverage of resources for the rural community through CSO fundraising and food donations within high-income communities undermined the conventional theory of relative advantage that posits resources flow to those who need it least in post-disaster recovery (Bang & Few, 2012; Drolet et al., 2015; Kaniasty & Norris, 2004). Availability of external social capital

frames the importance of mediation across relevant stakeholders in Health Promotion action, and the power of social mobilisation in achieving positive health outcomes.

6.2.3 Information & Communication

Information, Communication and Community Resilience

While information and communication in this study was related less directly to food security, it is an important factor in the holistic experience of community resilience and is inter-connected across adaptive capacities. The presence of robust and contextually appropriate information and communication systems is often seen as essential to community resilience; these systems are either organic products of intra-communal norms or extraneous structures that enable information flows within the community and across external stakeholders (Boon et al., 2012; Norris et al., 2008; Pfefferbaum et al., 2008). Houston et al. (2015) proffer a resilience framework, built upon Norris et al. (2008), but instead centrally oriented around information and communication that explores the beneficial components of and relationships within communication systems.

One key component beneficial to resilient outcomes is the presence of official sources of information, but case study evidence from South Africa maintains that information sources must be trusted and deliver sufficient information via locally appropriate delivery pathways (Harte et al., 2009; Houston et al., 2015; Longstaff, 2005). Within this study, community leadership structures and CSOs were found to be key sources of information, generating improved health outcomes and aiding compliancy of COVID-19 guidelines. It should also be noted that the extensive distribution of direct food aid by CSOs required the existence of a sufficient and contextually appropriate communication system within the community. Both community leadership and CSOs presented as locally appropriate and trusted sources, perhaps as both are deeply embedded within the community ecosystem; the Induna are a product of traditional cultural norms and CSOs are familiar from past interventions. Importantly, trust in CSOs has stemmed from positive interventions emphasising the importance of relationships in communication systems (Houston et al., 2015). However, as participants were selected purposively through a CSO gatekeeper some bias may have been introduced. Beneficial relationships within community communication systems were also influenced by social capital. Participants actively communicated with other community members because of networked relationships and organisational linkages enabled CSOs to be used as information sources. The dynamic socio-ecology of adaptive capacities is further illustrated.

Appropriate infrastructure that is sensitive to user needs is another important component of communication systems (Houston et al., 2015). Rural communities access information in diverse ways, for example Popoola et al. (2020) found that smallholder farmers utilised 13 different information sources when accessing hazard information, ranging from community radio to local farmers groups. Differences in preference or accessibility arise from various socio-economic characteristics including gender, age, literacy, geography and income (Dikotla et al., 2020; Fombad & Jiyane, 2019; Rey-Moreno et al., 2016; Shava & Chinyamurindi, 2018). Communication systems in Mopani District do show positive resilience attributes as information has been delivered across a diverse range of sources, be it radio, mobile phone, community meetings or health clinics. A key finding is the wide penetration of mobile phones and the possible beneficence of this mode of communication in promoting positive health and development outcomes. An example being the ability of CSOs to continue with food garden capacity training and mentorship via phone. An increasing body of literature underlines this potential (Ojo, 2018; Watkins et al., 2018). It should be noted however that households often shared a basic phone, reception is not total and not every household has access to TVs. Economic realities do therefore limit local communication systems.

Information, Communication and Health Promotion

Information and communication capacities are strongly linked to the field of Health Promotion and improved health outcomes. Strengthening community action to enable collective control over determinants of health is a key action area of the Ottawa Charter (WHO, 1986). Information regarding COVID-19 restrictions and health guidelines has informed engagement in less risky health behaviours such as social distancing, importantly this is also a barometer of community wellness and resilience according to Norris et al. (2008). Community action was also facilitated by the emergence of a virtual information and communications technology (ICT) platform through mobile phone usage, allowing community members to stay abreast of local news and required community activities. This is similar with what Odendaal (2021) termed ‘Community Action Networks’ (CAN), used to describe the use of ICT media platforms to organise community action in Cape Town during COVID-19. While Odendaal (2021) framed CAN as a phenomenon enabled by more advanced ICT devices in higher-income urban communities, this study suggests that CAN are also relevant in promoting health outcomes in rural low-income communities.

Perhaps more important however is the promotion of mental health among participants enabled by information and communication capacities, phone communication as a product of bonding social capital between participants was essential. Mental health forms a key aspect of

WHO quality of life measures and positive health outcomes within this study are particularly evident when mapped against a salutogenic health approach (WHO, 2012). Comprehensibility and manageability are key dimensions within the Sense of Coherence (SOC) framework, a key concept that promotes positive health on the health ease-disease continuum (Antonovsky, 1987). Comprehensibility, or the ability to understand external stimuli (COVID-19), has been influenced by information sources that have enabled participants to place individual and local community experience within the wider national and international context (Mittelmark et al., 2017). Manageability, or the belief that resources are available to cope with the stimuli, has been influenced by communication infrastructure that mobilised bonding social capital from a protective resource into an adaptive capacity despite social restrictions (Mittelmark et al., 2017). Mittelmark (2021) argues that while differences exist between resilience and salutogenic approaches to health, a strong SOC is a valuable asset for both individual and community resilience. Lindmark et al., (2005) even relate SOC directly to food security, suggesting a strong SOC promotes healthy food choices. While this is beyond the scope of the study and would require further research, the potential benefit of information and communication capacities to health outcomes is obvious.

6.2.4 Community Competence

Traditional Systems of Rural Knowledge & Practice

Community competence in this study will be framed as those processes and community-level characteristics that facilitate the use of resources. Community competence as an adaptive capacity is cross-cutting and deeply inter-connected with preceding capacities. However, the existence of community-level resources means little if they are not used. Traditional knowledge systems and local practices fit within community competence, framed by the asset-based understanding that competent communities have skills, capacities or knowledge resources (Kretzmann & McKnight, 1996; Nel, 2015; Shokane & Nel, 2020). Relevant to the field of Health Promotion, community competencies share conceptual similarities with the development of personal skills and creation of supportive environments to improve health outcomes (Fry & Zask, 2017; WHO, 1986). Shokane & Nel (2020), explore relevant capacities within GTZ by categorising them into: ‘Skills of Head’, ‘Skills of Hand’ and ‘Skills of Heart’.

‘Skills of Head’ and ‘Skills of Hand’ are explicit within this study through indigenous crop forage, use of natural fertilisers, methods of food storage and agricultural production. These skills have arisen through an underlying framework of traditional knowledge that passes adaptive

capacities across generations. Evidence across much of rural South Africa illustrates traditional knowledge systems as essential to adaptive capacity and the maintenance of food security following system shocks (Masekoameng & Molotja, 2019; Omotayo & Aremu, 2020; Ubisi et al., 2019). Crucially, traditional knowledge systems can be rapidly mobilised and are robust due to their pre-existing socio-ecological embeddedness; facilitating continued role functioning and quality of life with few negative consequences. Unfortunately, generational shifts threaten their erosion (Netshifhefhe et al., 2018; Omotayo & Aremu, 2020). The village setting once again becomes important as it is here that health promoting traditional personal skills are developed.

Collective Efficacy

'Skills of Heart' were witnessed through examples of co-operation in community betterment and participant definitions of community, where common ideals of 'unity' provide evidence of collective efficacy. Higher collective efficacy is traditionally linked to rural communities due to lower residential mobility, socio-economic and cultural homogeneity (Goodson & Bouffard, 2020; Lyons et al., 2016). Participant experience reflected this through the shared sense of community and place attachment, a by-product of bonding social capital highlighted previously. Crucially, collective efficacy influences health promoting community action. Elsewhere in South Africa for example, Schalkwyk et al. (2014) found that rural participants were more likely to participate in positive community action compared to urban participants because of a higher sense of community and Thornley et al. (2015) found that selfless action rooted in collective efficacy promoted community resilience in post-disaster communities in New Zealand. The value of collective efficacy is also widely reflected in theoretical literature as an enabling factor for quantitative outcomes arising from social capital (Cutter et al., 2008; Norris et al., 2008; Zukowski, 2014). Pre-event communal projects and examples of labour sharing before COVID-19 indicate a stock of collective efficacy that can promote health outcomes. Ensuring community-wide buy in would mitigate the examples of negative community behaviour that undermine collective efficacy. COVID-19 restrictions have also prevented much community action and so collective efficacy has gone largely untapped, mobilising collective efficacy following the future removal of restrictions would benefit long-term recovery. The veracity of collective efficacy ideals among participants is however open for debate; traditional power-dynamics between myself as the researcher and local participants may have influenced the prevalence of these upstream ideals.

Community Competence as Agency

The process of resilience is not unintentional, achieving adaptation requires active engagement from community members in the promotion of positive outcomes. Resilience literature often illustrates that agency, or individuals and communities that are motivated and able to effect change within their socio-ecological system, breeds positive outcomes (Harte et al., 2009; Odendaal, 2021; Walters et al., 2021). This understanding is also firmly embedded within Health Promotion, linked to theories of empowerment and symbolised by the inclusion of, 'Enable' as a core activity in the Ottawa Charter (WHO, 1986). From the findings, positive food security experiences are linked to the active adoption and interaction with socio-ecological protective factors such as participation in the informal sector, engagement in subsistence agriculture, communal reciprocity, social communication and adopting traditional practice. When agency has been restricted in post-crisis response, community resilience outcomes are often less positive (Adger et al., 2011; Liverpool-Tasie et al., 2021; Pereira & Ruysenaar, 2012). COVID-19 restrictions have undermined some capacity for agency. For example, suspension of 'two-way' communal meetings has limited community action. Significantly, Nleya (2011) explores the value of communal meetings in South Africa as sites of resilience that facilitate the critical analysis and resolution of community-level problems. While it is understood that COVID-19 restrictions are integral to overcoming the pandemic, empowering individuals could ameliorate the rising food insecurity crisis and would be essential in long-term recovery. Findings have highlighted that personal skill development, land availability and the informal economy are critical for the empowerment of rural communities and could improve both system resilience and health outcomes.

6.3 Caveats to Community Resilience in Mopani District

6.3.1 Adaptation as Sustainability

However, it is important to note the inherent vulnerability of a dependence on natural capital (Drysdale et al, 2021b; Mavengahama et al., 2013; Paumgarten et al., 2018). Findings acknowledged that both pre- and post-event food security was heavily influenced by climatic conditions, a worrying situation given predicted climate change and the resultant decline in agricultural yield (Connolly-Boutin & Smit, 2016; Shisanya & Mafongoya, 2016). Additionally, subsistence agriculture can perpetuate long-term poverty due to associated low capital returns (Brick & Visser, 2015; Sachs et al., 2004). Participants, although accounting for a higher

household-income before COVID-19 were still comparatively poor, suggesting that previous engagement in subsistence agriculture was not sufficient in building long-term adaptive capacity. Health promotion interventions based upon natural capital improvements then, although proffering an alternative food source for community households and thus building redundancy into the local food system, are not a panacea.

6.3.2 Inadequacy of Local Capital

Although this study contends that community-level adaptive capacities have been essential the experience of positive food security outcomes, it would be remiss to ignore the role of external protective factors in shaping participant experience. The availability of social welfare grants to low-income households, particularly aiding households with higher dependency ratios, was essential to the maintenance of food security among most households. Social welfare grants have frequently been analysed as fundamental to health outcomes among rural low-income communities in South Africa (Altman et al., 2009; Sharaunga, 2019). While I understand that the social grant mechanism in South Africa has been portrayed as a disincentive to self-reliance, certainly in this study reduced economic motivation was not discovered (Musemwa et al., 2015; Shackleton & Luckert, 2015; Sinyolo et al., 2019). Many participants receiving welfare grants were unemployed but this was attributed to socio-economic barriers due to COVID-19 rather than an absence of motivation – indeed most participants expressed a strong desire to engage in economic activity. As such, the social welfare grant system has been essential in maintaining short-term food security during COVID-19.

6.3.3 Inequity of Resources

Equity of economic resources is also important to consider relative to the experience of community resilience in Mopani District. Risk is not equal, individuals and communities with limited access to economic resources are more vulnerable to system shocks. Availability of economic resources in this study is framed by historic racial inequality in South Africa and the resultant inequity experienced by low-income rural Black communities (Mkhawani et al., 2016; Pienaar & von Fintal., 2014; Shackleton & Luckert, 2015). Taken together, the studies of Naidu (2020), Nwosu & Oyenubi (2021) and Visagie & Turok (2020) point to the fact that COVID-19 is exacerbating food insecurity along these pre-established inequities. This study, being located within former Bantustan territory, adds to this literature by highlighting the experience of food insecurity caused by COVID-19 in rural Black communities, undermining the attainment of both

the ‘Reduced Inequalities’ SDG and the Health For All priority of the WHO Alma Ata Declaration (UN, 2015; WHO, 1978).

At a community-level, much literature has also highlighted the added risk and burden of food insecurity experienced by women as a product of gender disparities (Chiwona-Karltun et al., 2021; Moseley & Battersby, 2020; Tibesigwa & Visser, 2016). The absence of male participants available for recruitment within CHoiCe Trust food garden projects is perhaps indicative of the traditional gendered role women play in households reliant on subsistence agriculture. Accordingly, women have been exposed to great psychological stress, shown by declining mental health among participants which influences both community resilience and health outcomes under quality of life measures (WHO, 2012). Furthermore, findings support the view that inequity can breed further inequity; those richer in socio-economic assets often have access to better livelihood strategies (Maziya et al., 2017; Megbowon & Mushunje, 2018). The manifestation of this reality is seen in the COVID-19 informal market permit system that disenfranchised micro-level sellers (Paganani et al., 2020; Wegerif, 2020). Indeed, only *Ofentse* in this study was able to access a permit, the participant with the highest socio-economic capital stock. Gender and intra-community inequity findings compound the need for marginalised populations within the community to be identified to enable equitable health outcomes. Intra-community inequity further undermines the experience of community resilience as higher community crime is linked to local income inequalities (Demombynes & Özler, 2005; Harris & Vermaak, 2015). Pre-event failures of communal projects due to theft are indicative.

6.3.4 Reliance on Social Capital

Social capital should also not be seen as a ‘magic bullet’, capable of achieving community resilience in isolation. Sharaunga (2019), while highlighting the importance of social capital maintains its insufficiency in lifting communities out of poverty. Mbiba et al. (2019) support this view, arguing that social capital is less important than other capital assets in buffering against livelihood shocks in rural South Africa. This can be explained perhaps by the dynamic relationship between reciprocity and income. Lower income is linked to an inability to participate in social networks because of a lack of shareable resources or capital constraints (Offer, 2012). Tibesigwa et al. (2016) for example found that ‘formal social capital’, measured by membership in groups and associations, is quantifiably higher among high-income groups and as such these communities have greater access to diverse network resources. Study findings support the available literature as examples of reciprocity are largely limited to the sharing of products resultant from subsistence

agriculture. Often, quantitative examples of reciprocity were restricted by the availability of household resources. Participants were also less likely to ask for help because of the perceived unavailability of resource assistance. Indeed, in some cases social capital exacerbated the financial burden of participants as societal norms required the continued payment of community burial duties. Offer (2012) links the burden of such reciprocity among low-income communities to increased socio-ecological stress. Therefore, although social capital in rural low-income communities has obvious benefits, reliance on social capital alone is naïve.

6.4 Learning Outcome: Economic Development as Foundation of Community Resilience

Across much theoretical resilience literature, adaptive capacities are presented as mutually inter-connected and as equal components of resilience models (Cutter et al., 2008; Norris et al., 2008; Sherrieb et al., 2010). However, it was well established that food security outcomes in South Africa prior to COVID-19 were primarily linked to the diversity, volume and equity of economic resources such as education, employment, financial and physical capital assets (Maziya et al., 2017; Mbajiorgua, 2020; Ngema et al., 2018; Yobe et al., 2019). Fundamentally, the main statistical determinant of adaptive capacity in rural South Africa is often financial capital (Raaijmakers & Swanepoel, 2019). The evidence is compelling, low household income prevents the accumulation of capital assets thereby limiting redundancy pathways within household and community food systems and the capacity to offset system shocks (Drysdale et al, 2021a; Ndhleve et al., 2012). Emergent literature on food security during COVID-19 has similarly drawn conclusions that populations reliant on low paid wage labour are especially vulnerable, despite wider capacities (Arndt et al., 2020; Kansiime et al., 2021; Mhlanga & Ndhlovu, 2020; Swinnen & McDermott, 2020). The impact of COVID-19 within this study has been no different. Households with the lowest income experienced greater food insecurity and were less able to adopt positive coping strategies despite operating within the same community microcosm. Instead more negative and unsustainable coping strategies were often seen. The influence of economic development over the other core adaptive capacities is also often evident as a limiting factor. Thus, presenting community resilience as an outcome of four equally weighted adaptive capacities is perhaps naïve and ignores the reality that poverty fundamentally influences health and development. Framing economic development as the cornerstone of community resilience seems just, this is represented by an updated version of the Community Resilience model used in this study shown in Appendix 6.

6.5 Limitations

COVID-19 was in and of itself a significant limitation for this research study. Having originally planned to conduct in-person research the reliance on remote research undermined the capacity to understand the lived experience of participants. Although the interview process was thorough, inability to observe participant surroundings or meet participants limited data richness and understanding. Recruitment was also conducted remotely which proved difficult and recruitment done by CHoiCe Trust through existing food security programs may not be representative of the contextual situation. Additionally, utilising remote data collection methods in a rural area with unreliable data connection was inefficient.

Researcher positionality may also have introduced bias into local understanding, exacerbated by the use of a local research assistant that introduced another intermediary to the interview process. Additionally, as the research assistant was a representative of a known local NGO and participants were known to her, bias in participant answers may have occurred. Traditional power imbalances between an outside researcher and participants must also be understood as potentially influencing participant response.

Finally, typical limitations related to a 30 ECTS thesis are obvious. Trustworthiness of data would be improved through a more in-depth study across more participants. As such, time and scope limitations are important to recognise within data findings and conclusions.

7. Conclusion and Recommendations

7.1 Conclusion

Study objectives were to explore the impact of COVID-19 as a food security stressor in Limpopo Province and to use the Community Resilience framework as a lens to explore community adaptive capacity. The existence of adaptive capacities that enabled some positive, or less negative, food security outcomes illustrates the value of strengths-based approaches to health and the potential rapidity and sustainability of bottom-up holistic approaches.

COVID-19 has been shown to be a significant stressor on local food systems in rural Limpopo, influencing all four conceptual components of food security. Economic access to food has been reduced by the combined influence of declining household income and food price inflation. The decline in household income is primarily attributed to the COVID-19 restrictions that severely reduced both formal and informal employment. Physical access to food has been reduced through travel restrictions, the suspension of SFPs and the emergence of intangible barriers to market access – primarily the fear of viral transmission. Food availability in formal

markets has not been significantly influenced by COVID-19, however the erosion of informal market supply has restricted market choice. Consumers are forced to rely on the formal market which is less accessible for many. Food availability has been further influenced by the declining availability of key agricultural inputs, such as seed. This has also threatened the viability of subsistence agriculture as an adaptive strategy. Food utility impacts are seen in the insufficiency of local diet, both in terms of caloric intake and nutrient diversity. Households are now consuming less food and substituting dietary options for cheaper and less nutritious food types.

Protective factors that enabled adaptation to COVID-19 related food insecurity include the availability of economic resources that built food system redundancy. Natural capital enabled subsistence agriculture and helped facilitate informal economic activity which promoted positive food security. Additionally, bonding and linking social capital were found to be protective. Reciprocity founded upon informal norms and aided by formal community structures directly led to positive food security for beneficiaries. Importantly, leveraging linking social capital through key stakeholders such as CSOs was a crucial and rapidly mobilised factor. Information and communication network resilience is influenced by trust between providers and users, infrastructure and social capital that promotes intra-community communication. Rural penetration of mobile phones is found to be particularly beneficial during COVID-19 as a way of mitigating social contact and movement restrictions. Finally, community competence mobilises many of the adaptive resources at community-level. Traditional knowledge enabled the maximisation of natural capital and individual agency generated income through informal sector activity.

However, there are some key caveats to the experience of community resilience. A major learning outcome relevant to the Community Resilience framework is that economic development disproportionately influenced adaptive capacity. Household income was the main determinant of food security and the diversity, volume and equity of economic resources across the community defined the positive adaptive capacity of social capital, information and communication and community competence. This is shown in the updated Community Resilience model in Appendix 6. Crucially, available economic resources may not be sustainable under current climate predications and policy practice. Finally, inequity and vulnerability to risk framed by contextual economic development cannot be ignored. COVID-19 is a severe stressor capable of causing system dysfunction in the most resilient communities, but rural black communities in South Africa are plagued by vulnerabilities founded upon historical racial inequality. Therefore, although community-level protective factors do exist, external support is sometimes still necessary to prevent disaster and kickstart recovery.

7.2 Recommendations

Recommendations for further research are as follows:

1) Research is needed regarding the long-term effect of COVID-19 on food security in rural low-income communities. The potential for knock-on generational impacts of COVID-19 that exacerbate existing inequalities in South Africa is worrying.
2) Further research exploring the hypothesis that adaptive capacity is influenced primarily by economic development is needed.
3) Perceptions and experiences in this study are gender specific; research that explores divergent male experience of food security during COVID-19 would be useful. Do men have access to different adaptive capacities within the community?

Practical recommendations relevant to short and long-term Health Promotion action are as follows:

1) Promote sustainable subsistence agriculture – deep-rooted structural changes to reduce agricultural dependence are beyond the study scope, the current importance of subsistence agriculture to food security however cannot be ignored. In the short-term, enabling healthy behaviours through resource empowerment and skills development is key; essential agro-inputs and continued education on sustainable practices must be made available. In the long-term, good governance through progressive land reform would benefit rural communities.
2) Build stakeholder linkages – key stakeholders in the community that leverage external 'linking' capital resources should be recognised to mitigate short term food insecurity. Increasing the diversity of key stakeholders would build long term resilience.
3) Safeguard the informal economy - in the short-term equitable governance of the informal sector could re-energise economic activity in the rural community. Long-term, safeguarding of the informal economy could enhance the supportive environment of rural communities.
4) Maintenance of traditional knowledge for personal skill development – changing socio-demographics of rural South Africa threaten the erosion of traditional knowledge and practices, maintaining skills across generations is important.
5) Promote community action through improved information & communication – information and communication enables community competence and increases resilience. Enabling traditional networks as well as making use of available modern technology such as mobile phones would foster resilient communities.

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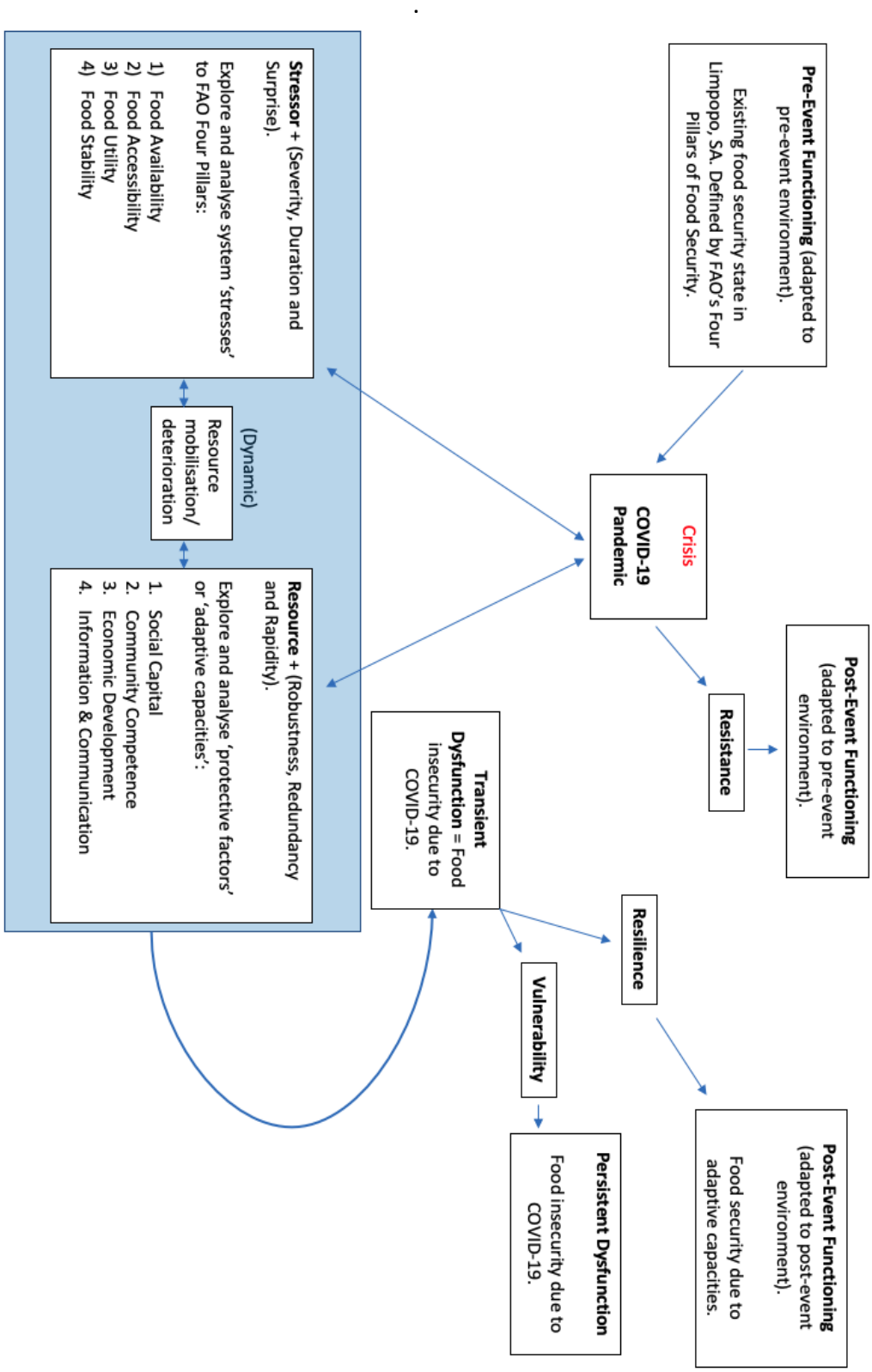
9. Appendices

Appendix 1: Community Resilience Framework Model (Adapted from Norris et al., 2008).



Appendix 2: Informed Consent

Are you interested in taking part in the research project:
***"Adaptive Nutrition Strategy in Limpopo Province, South Africa: Exploring community-level resilience strategies to COVID-19 related food insecurity"*?**

This is an inquiry about participation in a research project where the main purpose is to explore community resilience and food security in Limpopo during the COVID-19 pandemic. In this letter we will give you information about the purpose of the project and what your participation will involve.

Purpose of the project

This study intends to explore community resilience factors and adaptive nutrition strategies that maintain food security in Limpopo Province, South Africa. This research project aims to provide a thick descriptive background and analysis of current resilience. In doing so, I hope to provide evidence-based recommendations that inform more effective and robust adaptive nutrition policies aimed at combatting food insecurity within Limpopo.

This research study forms an academic thesis in fulfilment of Masters of Philosophy in Global Development Theory and Practice, University of Bergen.

Who is responsible for the research project?

University of Bergen is the institution responsible for the project.

Researcher: Mathias Venning
Supervisor: Marguerite Daniel

Research undertaken in collaboration with Choice Trust, Tzaneen.

Why are you being asked to participate?

Participants are to be selected at two distinct levels:

Participant Group 1: Key Informants (approx. 1-2 participants):

1) Work for a Non-Governmental Agency acting within Limpopo Province, South Africa.
2) Work within or have knowledge of COVID-19 adaptation strategies within Limpopo Province.
3) Work within or have knowledge of current community-level issues surrounding food security in Limpopo Province.

Participant Group 2: Community members within Greater Tzaneen Municipality, Limpopo Province South Africa (approx. 8-10 participants):

1) Participants are to be selected from rural and urban communities within Greater Tzaneen Municipality.
2) Participate in the household food system.
3) Have knowledge of COVID-19 socio-economic restrictions.

4) Have experienced or have knowledge of food insecurity due to COVID-19.
5) Be 18 years or older.
6) Speak English or be willing to communicate through a translator (provided).

What does participation involve for you?

Either (1) or (2) – indicated on cover sheet.

In-depth Interview: Participation will require a 1-hour one-to-one (or additional presence of a local translator if necessary) interview. Written notes and an audio recording device will be used. Interview will be conducted via remote means through an online platform (provided) or through an intermediary research assistant through CHoiCe Trust via mobile phone (calls provided).

Focus Group Discussion (if possible under COVID-19 restrictions): Participation will require a 2-hour group discussion with a max. 3 other participants. Participants will preferably be unknown to you but share similar experiences. Discussion will be moderated by the researcher and may require the presence of a local translator. Written notes and an audio recording device will be used. Focus Group Discussion will be conducted via remote means through an online platform (provided) or through an intermediary research assistant through CHoiCe Trust (provided).

Participation is voluntary

Participation in the project is voluntary. If you chose to participate, you can withdraw your consent at any time without giving a reason. All information about you will then be made anonymous. There will be no negative consequences for you if you chose not to participate or later decide to withdraw.

Your personal privacy – how we will store and use your personal data

We will only use your personal data for the purpose(s) specified in this information letter. We will process your personal data confidentially and in accordance with data protection legislation (General Data Protection Regulation and Personal Data Act).

Data will only be accessible to myself (Mathias Venning), Supervisor (Marguerite Daniel) and the local CHoiCe Trust research assistant.

Measures to ensure privacy:

1) We will replace your name and contact details with a code.
2) The collected list of names, contact details and respective codes will be stored separately from the rest of the collected data.
3) I will store sensitive data on the encrypted research server SAFE through University of Bergen, Norway.
4) Written notes will be stored in a locked cabinet. Non-sensitive electronic notes will be stored in a password protected personal computer.
5) Published data will ensure participant anonymity unless otherwise specified.
6) Data will be coded using NVivo software.

What will happen to your personal data at the end of the research project?

The project is scheduled to end ***May 2021.*** Data will be archived following EU GDPR regulations. Archived data may be used for further PhD research purposes

Your rights

So long as you can be identified in the collected data, you have the right to:

1) Access the personal data that is being processed about you
2) Request that your personal data is deleted
3) Request that incorrect personal data about you is corrected/rectified
4) Receive a copy of your personal data (data portability), and
5) Send a complaint to the Data Protection Officer or The Norwegian Data Protection Authority regarding the processing of your personal data

What gives us the right to process your personal data?

We will process your personal data based on your consent.

Based on an agreement with *University of Bergen,* NSD – The Norwegian Centre for Research Data AS has assessed that the processing of personal data in this project is in accordance with data protection legislation.

Where can I find out more?
If you have questions about the project, or want to exercise your rights, contact:

University of Bergen, Norway.
HEMIL Centre.

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Yours sincerely,

Mathias Venning
(Researcher)

Marguerite Daniel
(Supervisor)

Consent form

I have received and understood information about the project "***Adaptive Nutrition Strategy in Limpopo Province, South Africa: Exploring community-level resilience strategies to COVID-19 related food insecurity****"* and have been given the opportunity to ask questions. I give consent:

- ☐ To participate in In-depth Interview
- ☐ To participate in Focus Group Discussion
- ☐ For Data to be published in a way that I can be recognized through use of name, workplace, position, geographic location.

I give consent for my personal data to be processed until the end date of the project, approx. *May 30th 2021.*

(Signed by participant, date)

Appendix 3: Document Analysis Protocol

Documents were accessed online through systematic Google searches using a three level approach, outlined in Table (1) below. The first 10 pages of Google were used. Further documentation was discovered via hand-searching relevant NGO, Government or Newspaper websites. 21 relevant documents were found within exclusion criteria (see Tables (2) and (3)). Review protocol is shown in Figure (1).

Level One	**Level Two**	**Level Three**
Limpopo Province	COVID-19	Food Security/Insecurity
Greater Tzaneen Municipality	Coronavirus	Food
Mopani District Municipality		Nutrition
		Market
		Subsistence Agriculture
		Subsistence Farming
		Resilience
		Adaptation
		Vulnerabilities

Table (1)

Inclusion Criteria	Exclusion Criteria
Only documents that explicitly relate experience of food security to COVID-19	Theoretical – documents that predicted potential impacts rather than reported on actual experiences
Documents published from 27th March 2020 – March 1st 2021	Source Type – documents were excluded if not from reputable source
Documents relevant to Limpopo Province, South Africa	

Table (2)

Title	**Author**	**Type**
Over 90,000 applications for food parcels in Limpopo	The South African	News Article
Some Limpopo residents unhappy with food distribution	SABC News	News Article
Limpopo Education investigates allegations of teachers stealing from school nutrition programme	SABC News	News Article

Call to help feed more people affected by COVID-19 in Limpopo	The Citizen	News Article
Limpopo DA calls for food aid as 1.6m pupils go hungry	The Citizen	News Article
COVID-19: 'Farmers are godsend during this pandemic'	Food For Mzansi	News Article
Department to distribute food parcels to needy households in Limpopo	Polokwane Review	News Article
Informal traders live in fear without protective gear	Health-E News	News Article
Child hunger on the rise	Health-E News	News Article
Impact of climate change on food security in rural areas	CAS Newsroom	News Article
Pupils not getting school meals because transport costs too much	Times Live SA	News Article
Limpopo residents up in arms over distribution of food parcels by councillors	News24	News Article
Limpopo Education Department to resume school feeding from July 1	Sowetan Live	News Article
Court orders Government to provide all schoolchildren with a daily meal	Daily Maverick SA	News Article
Villagers run on empty as COVID-19 lockdown drags o	Daily Maverick SA	News Article
Limpopo centralises food distribution	ENCA	News Article
Surviving COVID-19: A reflection about the South African Agricultural sector	Agricultural Attachments Network	Government Bulletin
Limpopo State of the Province Address 2021/2022	Premier Chupu Mathabatha	Government Address (transcribed)
Food security declared an essential service during Coronavirus COVID-19	Minister Thoko Didiza	Government Media Statement (transcribed)
Limpopo Provincial Government on its COVID-19 response plans	Parliamentary Monitoring Group	Government Meeting (transcribed)
Implementation of food distribution programmes: MECs and HODs briefing.	Parliamentary Monitoring Group	Government Meeting (transcribed)

Table (3)

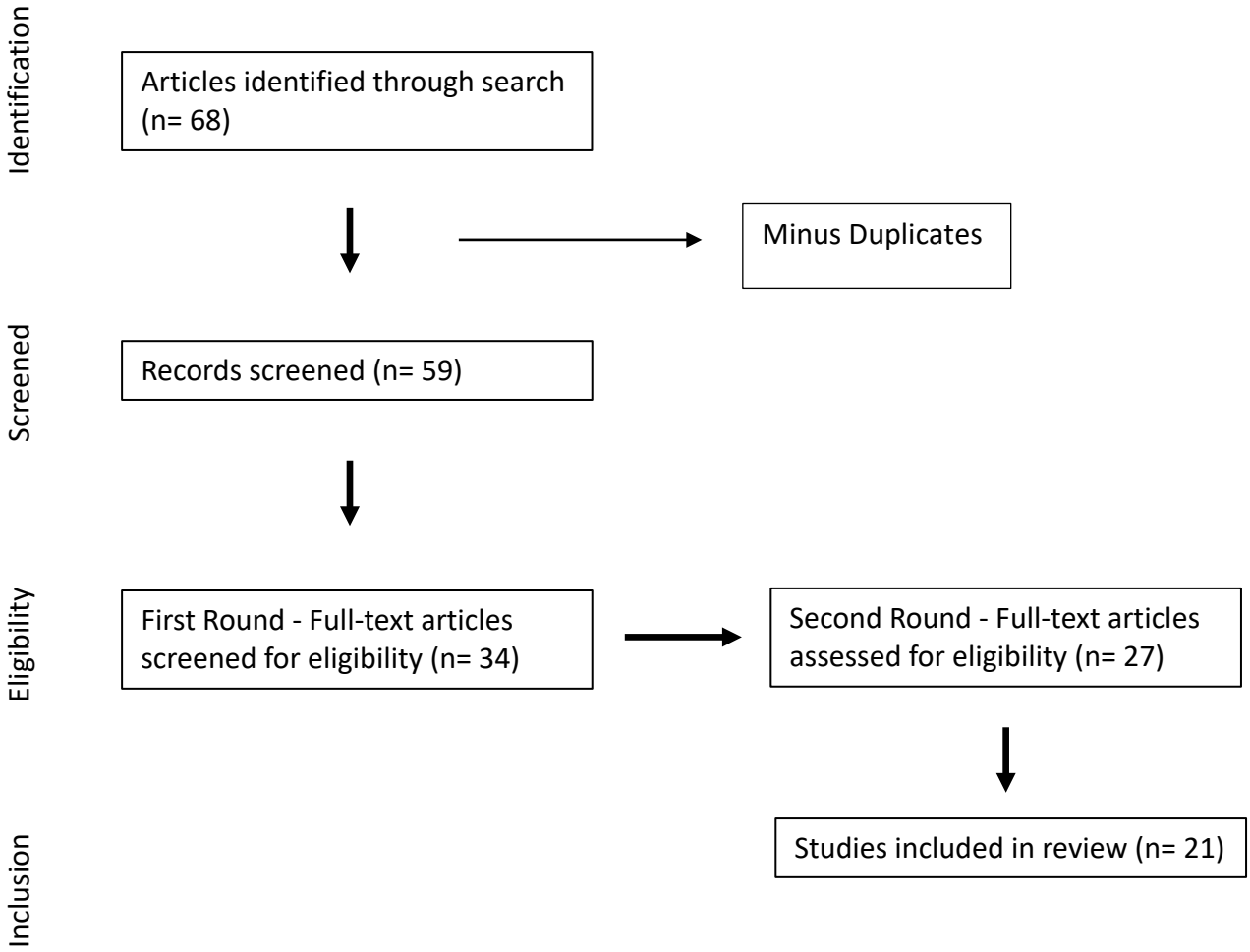

Identification
Articles identified through search (n= 68)
Minus Duplicates
Screened
Records screened (n= 59)
Eligibility
First Round - Full-text articles screened for eligibility (n= 34)
Second Round - Full-text articles assessed for eligibility (n= 27)
Inclusion
Studies included in review (n= 21)

Figure (1)

Appendix 4: Topic Guide

Topic Guide for Participant Group 1 – NGO representatives

Introduction & background

1) What organisation/government department do you work for/represent?
2) How is your organisation/government department involved within food policy or food security activities within Limpopo?
3) How do you understand food security within Limpopo?
4) Prior to COVID-19, how would you describe the food security landscape within Limpopo? (*main issues/challenges/actors relating to access/availability/utility)*

Current stressors & responses of COVID-19 related food insecurity & vulnerabilities (impact on availability, access, utility and stability)

1) How has COVID-19 changed the food security landscape within Limpopo? (challenges/impact on availability/access/utility)
2) How has COVID-19 changed your organisations/government departments activities/function/capacity within the food security sphere in Limpopo?
3) Describe your organisations/government departments new activities/role within the food security sphere of Limpopo under COVID restrictions? (Explore policy/interventions/partnerships etc)
4) What information/guidance have you received regarding food security and COVID-19 restrictions? Describe how you received this? Was it sufficient?
5) How have you passed information on regarding COVID-19 restrictions?

Interview Guide for Participant Group 2 – Local Participants

Introduction & background to food security

1) Where do you live? (Non-specific, just urban/rural area)
2) Who do you live with? (*aim to discover household numbers, household economic capacity).*
3) Where/what do you do for a living/work?
4) What has been your experience with COVID-19? (*aim to discover if participants have had/know someone who has had COVID. Important if within close family connections).*
5) Before COVID-19 how did you access food? (*For example market, street vendors, shop, grow it yourself, school nutrition programmes, trade, government schemes/help, other sources*).
6) What kinds of foods did you normally access before COVID-19?
7) What do you understand by the term "food security"?
8) Before COVID-19, how would you describe your/your household food security?

Current stressors of COVID-19 related food insecurity & vulnerabilities (impact on availability, access, utility and stability).

1) How has COVID-19 changed how you get your food? (Access: *change of sources, absence of traditional sources, made it easier – how? Made it harder – how?)*

2) How has COVID-19 changed how you work/make a living? How has this changed how you get your food?
3) How has COVID-19 changed what foods are available? *(discover if there was more/less/same food available – why? Different types of food now available?)*
4) If participant said that food was accessed through government/NGO/community organisations – How has COVID-19 changed any food support you receive?

Social Capital:

1) What do you understand by the term "community"?
2) How important is your community to you? What makes your community important to you?
3) How involved in your community are you? What kind of activities or groups have allowed you to be involved in your community – describe these groups/activities? (*discover integration and opportunities for integration).*
4) How did your community help with food security during COVID-19? (*discover examples of community help regarding access or availability of food).*
5) If participants did receive help – how did receiving help from your community make you feel?
6) How did you help others in your community with food security during COVID-19? If yes, why did you help?

Community competence (also covered in Social Capital & Information and Communication):

1) Can you describe any wider community actions/events that helped food security during COVID-19? (Try to discover who was involved? Was/how was participant involved? Did participant want to be involved?)
2) How important/successful were these events/actions?

Information & Communication

1) How were you informed of COVID-19 restrictions?
2) How did you understand the restrictions?
3) How did you experience these restrictions? (Discover if participant followed restrictions)
4) Can you describe the information you received during COVID-19 about new food programs and/or changes to the normal ways you access food during COVID-19? How did you receive this information?
5) What opportunity do you have to communicate with community members, leaders, NGO/Gov members?

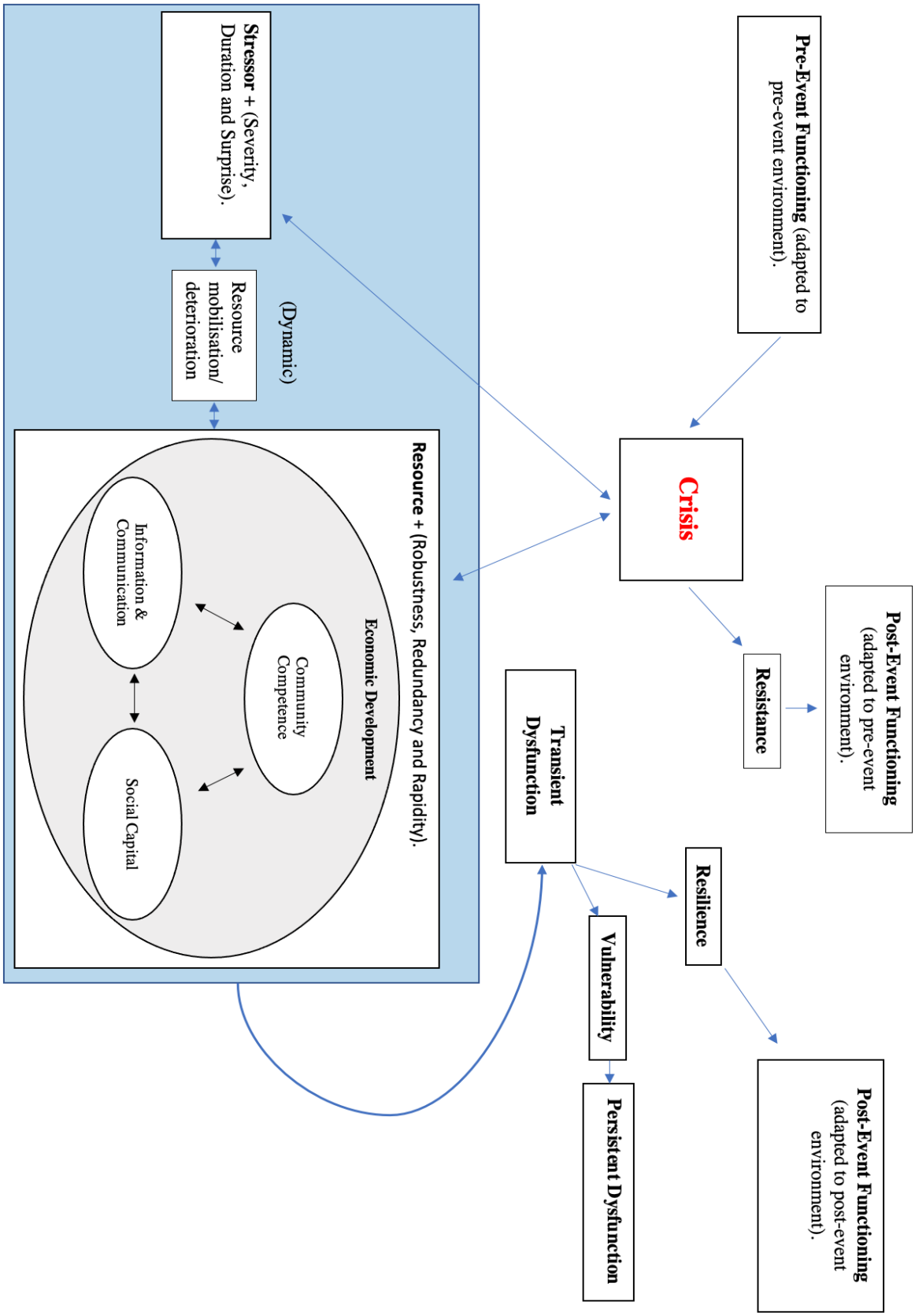
Other themes to explore:

Individual changes in behaviour/use of resources? Why did you change behaviours? Influenced by anyone in community?

Appendix 5: Thematic Network Analysis

Vulnerabilities	Pre-COVID-19 Vulnerabilities	Adverse Household Characteristics
		Weak Labour Market
		Pre-Existing Mal-Utility
		Vulnerability of Subsistence Agriculture
		Low Government Capacity
		Insecurity, Inequity and Inadequacy in Community Capacities
	COVID-19 as Food System Stressor	Impact of COVID-19 on Economic Access to Food
		Impact of COVID-19 on Physical Access to Food
		Impact of COVID-19 on Food Availability
		Impact of COVID-19 on Food Utility
	COVID-19 as Community System Stressor	Erosion of Intra-Community Support
		COVID-19 Impact on Mental Health
		Restricted Function of Informal Sector
		Weakening of Community Leadership
		Deterioration of CSO Capacity
		Insufficient Information & Communication
Protective Factors	Pre-COVID Protective Factors	Positive Household Characteristics
		Role of the Informal Sector
		Community Membership
		Community Leadership
		Government Social Protection
		CSO Activities
	Coping and Adaptation Strategies	Traditional Knowledge & Local Practice
		Inter- and Intra-Community Support
		Informal Sector Activity
		Government Social Protection
		CSO as Community Resource
		Information & Communication

Appendix 6: Updated Community Resilience Model



Appendix 7: NSD Ethics Approval

NSD NORSK SENTER FOR FORSKNINGSDATA

NSD's assessment Project title

Adaptive Nutrition Strategy in Limpopo Province, South Africa: Exploring community-level resilience strategies to COVID-19 related food insecurity

Reference number

508345

Registered

28.11.2020 by Mathias Venning - Mathias.Venning@student.uib.no

Institution responsible for treatment

University of Bergen / The Faculty of Psychology / Hemil Center

Project manager (scientific employee / supervisor or research fellow)

Marguerite Daniel, marguerite.daniel@uib.no, tel: 4797432721

Type of project

Student project, master's degree

Contact information, student

Mathias Venning, qut014@uib.no, tel: 00447561531670

Project period

15.12.2020 - 31.05.2021

Status

04.01.2021 - Assessed

Rating (1)

04.01.2021 - Assessed

Our assessment is that the processing of personal data in this project will comply with data protection legislation, so long as it is carried out in accordance with what is documented in the Notification Form and attachments, dated 04 January 2021, as well as in correspondence with NSD. Everything is in place for the processing to begin.

NOTIFY CHANGES
If you intend to make changes to the processing of personal data in this project it may be necessary to notify NSD. This is done by updating the Notification Form. On our website we explain which changes must be notified. Wait until you receive an answer from us before you carry out the changes.

TYPE OF DATA AND DURATION
The project will be processing special categories of personal data about health, and general categories of personal data, until 31 May 2021.

LEGAL BASIS
The project will gain consent from data subjects to process their personal data. We find that consent will meet the necessary requirements under art. 4 (11) and 7, in that it will be a freely given, specific, informed and unambiguous statement or action, which will be documented and can be withdrawn.

The legal basis for processing special categories of personal data is therefore explicit consent given by the data subject, cf. the General Data Protection Regulation art. 6.1 a), cf. art. 9.2 a), cf. the Personal Data Act § 10, cf. § 9 (2).

PRINCIPLES RELATING TO PROCESSING PERSONAL DATA
NSD finds that the planned processing of personal data will be in accordance with the principles under the General Data Protection Regulation regarding:

• lawfulness, fairness and transparency (art. 5.1 a), in that data subjects will receive sufficient information about the processing and will give their consent
• purpose limitation (art. 5.1 b), in that personal data will be collected for specified, explicit and legitimate purposes, and will not be processed for new, incompatible purposes

• data minimisation (art. 5.1 c), in that only personal data which are adequate, relevant and necessary for the purpose of the project will be processed
• storage limitation (art. 5.1 e), in that personal data will not be stored for longer than is necessary to fulfil the project's purpose

THE RIGHTS OF DATA SUBJECTS
Data subjects will have the following rights in this project: transparency (art. 12), information (art. 13), access (art. 15), rectification (art. 16), erasure (art. 17), restriction of processing (art. 18), notification (art. 19), data portability (art. 20). These rights apply so long as the data subject can be identified in the collected data.

NSD finds that the information that will be given to data subjects about the processing of their personal data will meet the legal requirements for form and content, cf. art. 12.1 and art. 13.

We remind you that if a data subject contacts you about their rights, the data controller has a duty to reply within a month.

FOLLOW YOUR INSTITUTION'S GUIDELINES
NSD presupposes that the project will meet the requirements of accuracy (art. 5.1 d), integrity and confidentiality (art. 5.1 f) and security (art. 32) when processing personal data.

Microsoft Skype, Zoom and a CHoiCe Trust research assistant are data processors for the project. NSD presupposes that the processing of personal data by a data processor meets the requirements under the General Data Protection Regulation arts. 28 and 29.

To ensure that these requirements are met you must follow your institution's internal guidelines and/or consult with your institution (i.e. the institution responsible for the project).

FOLLOW-UP OF THE PROJECT
NSD will follow up the progress of the project at the planned end date in order to determine whether the processing of personal data has been concluded.

Good luck with the project!

Contact person at NSD: Simon Gogl
Data Protection Services for Research: +47 55 58 21 17 (press 1)

Appendix 8: Limpopo Provincial Research Ethics Committee Approval

CONFIDENTIAL

LIMPOPO
PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

OFFICE OF THE PREMIER

Office of the Premier

Research and Development Directorate

Private Bag X9483, Polokwane, 0700, South Africa

Tel: (015) 230 9910, Email: mokobij@premier.limpopo.gov.za

LIMPOPO PROVINCIAL RESEARCH ETHICS

COMMITTEE CLEARANCE CERTIFICATE

Project Number: LPREC/33/2021: PG

Subject: Adaptive Nutrition Strategy in Limpopo Province, South Africa: Exploring Community-Level Resilience Strategies to Covid-19 Related Food Security

Researcher: Venning M

Dr Thembinkosi Mabila

Chairperson: Limpopo Provincial Research Ethics Committee

The Limpopo Provincial Research Ethics Committee (LPREC) is registered with National Health Research Council (NHREC) Registration Number **REC-111513-038.**

Note:

i. **This study is categorized as a Low Risk Level in accordance with risk level descriptors as enshrined in LPREC Standard Operating Procedures (SOPs)**

ii. **Should there be any amendment to the approved research proposal; the researcher(s) must re-submit the proposal to the ethics committee for review prior data collection.**

iii. **The researcher(s) must provide annual reporting to the committee as well as the relevant department and also provide the department with the final report/thesis.**

iv. **The ethical clearance certificate is valid for 12 months. Should the need to extend the period for data collection arise then the researcher should renew the certificate through LPREC secretariat. PLEASE QUOTE THE PROJECT NUMBER IN ALL ENQUIRIES.**