

BUILDING RESILIENT URBAN FOOD SYSTEMS

A Study of
»» the Breede Valley Municipality,
South Africa

Carolina Milhorance CIRAD
Sara Mercandalli CIRAD
T. Remoneilwe Mogatosi DSI-NRF Centre of Excellence in Food Security
Arlene Alpha CIRAD
Magalie Bourblanc CIRAD
Julian May DSI-NRF Centre of Excellence in Food Security

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LIST OF ACRONYMS

- AgriBEE** – Broad-Based Black Economic Empowerment Framework for Agriculture
- BEEE** – Broad-Based Black Economic Empowerment
- BVM** – Breede Valley Municipality
- Casidra** – Cape Agency for Sustainable Integrated Development in Rural Areas
- CoE-FS** – Centre of Excellence in Food Security
- CWD** – Cape Winelands District
- DALRRD** – Department of Agriculture, Land Reform and Rural Development
- DAFF** – Department of Agriculture, Forestry and Fisheries
- DSD** – Department of Social Development
- ECD** – Early Childhood Development
- ESTA** – Extension of Security of Tenure Act
- F4C** – Food for Cities
- FAO** – Food and Agriculture Organization
- FPEF** – Fresh Produce Exporters Forum
- GVC** – Global Value Chain
- HLPE** – High Level Panel of Experts on Food Security and Nutrition
- IFSS** – Integrated Food Security Strategy
- NAMC** – National Agricultural Marketing Council
- NAHF** – National Animal Health Forum
- NCCRP** – National Climate Change Response Paper
- NDP** – National Development Plan
- NSNP** – National School Nutrition Programme
- PPECB** – Perishable Products Export Control Board
- SAPA** – South African Poultry Association
- SATI** – South African Table Grape Industry
- SAWITU** – South African Wine Transformation Unit
- SMMEs** – Small, Medium, and Micro Enterprises
- SSRN** – Social Science Research Network
- Stats SA** – Statistics South Africa
- UrbanFosc** – Urban Food Resilience under Climate Change Challenges
- WCDoA** – Western Cape Department of Agriculture
- WCG** – Western Cape Government
- WIETA** – Wine & Agricultural Ethical Trade Association
- WOSA** – Wines of South Africa

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KEY MESSAGES

››› RELEVANCE OF A TERRITORIAL FOOD SYSTEM APPROACH

The territorial (or place-based) food system approach is a strategic response to the challenges of food and nutrition security, crucial in the context of rapid demographic growth and uneven economic development in African urban centres. The approach critiques policies that are overly focused on agricultural production and advocates for comprehensive and cross-sectoral solutions rooted locally, yet responsive to global influences and pressures. It recommends a broad assessment of the food supply chain, which goes beyond the origin of food to encompass governance, environmental concerns, rural-urban connections and socio-economic structures. It acknowledges that system participants are not merely producers, distributors and consumers, but community members with unique potentials and constraints. This approach supports collective action, underlining the need for diverse efforts, alliances and a multi-dimensional understanding of food systems.

››› THE BREEDE VALLEY MUNICIPALITY FOOD SYSTEM IS DYNAMIC YET MARKED BY SIGNIFICANT DISPARITIES

The BVM food system, emblematic of South Africa's agricultural and food landscape, exhibits a stark duality: a formal, commercial sector linked to global markets coexists with marginalized, small-scale farmers and informal vendors. This dualistic structure reflects major socio-economic disparities between the large commercial entities, which thrive on global integration, and smaller producers and vulnerable populations, who are grappling with restricted access to resources, markets and income. Agricultural production and export-driven growth boost economic indicators, while the equitable distribution of nutritious food to the local population tends to be overlooked. Despite being the breadbasket of the Western Cape, there is stark evidence of the unequal access to healthy food: the rates of malnutrition in the area, including stunting, are above the national average. Although it has the capacity to produce almost 70% of the food groups consumed locally, regions like Worcester, Rawsonville, De Doorns and Touws River are in a paradoxical situation: agricultural production is abundant, yet the local food supply is limited and relies on imports from other regions and global markets.

››› A FOOD SYSTEM UNDER PRESSURE

The BVM is an attractive and burgeoning area that, like many others, is facing significant environmental and socio-economic challenges. These include water scarcity, the effects of climate change, competition for resources, high unemployment, poverty, limited transport and a limited power supply. This situation puts pressure on natural resources, as well as on the food system's ability to ensure food and nutrition security. In addition, market prices and access fluctuate as a result of global trade dynamics and international disruptions, such as the war in Ukraine and trade disputes with the European Union. The labour demands of modern agriculture have brought precariousness and instability for workers, increasing socio-economic vulnerability, with the expansion of informal settlements, and social unrest. The electricity crisis in South Africa impacts sectors that require a reliable power supply. Rising agricultural input costs reduce profitability and encourage consolidation. Security issues in rural areas, exacerbated by inadequate infrastructure, deter agricultural investment. The obstacles to resilience and sustainability are evident, not only at the farm level, but also across agricultural value chains and interconnected sectors, such as water and manufacturing.

››› CLIMATE CHANGE IS A SIGNIFICANT RISK FOR STAKEHOLDERS IN THE BVM FOOD SYSTEM, DESPITE BEING PERCEIVED AS A SECONDARY ISSUE

Climate change affects every aspect of the food system, from agricultural productivity to socio-economic stability because it has an impact on temperature, precipitation, and extreme weather. While key stakeholders in the BVM food system acknowledge the problems of climate change, they often give priority to broader regional challenges, such as immediate socio-economic and infrastructural issues. In general, there is a common perception amongst the farmers' community that they can cope with episodes of drought, given their water-efficient irrigation systems. They are more concerned about erratic weather patterns, such as untimely (out of

season) rains than about climate change. The latter is not yet perceived as a threat to their farming activities. This encourages the unsustainable use of natural resources during heat waves, such as the unregulated use of groundwater (drilling boreholes).

>>> FOCUSING ON THE FOOD SYSTEM'S RESILIENCE IS VALUABLE FOR ENCOURAGING COLLECTIVE ACTION

The resilience of the food system depends on different principles, including diversity/functional redundancy, connectivity, and adaptability. An in-depth understanding of the food system helps stakeholders grasp the implications of the various trade-offs between essential outcomes, such as food security, environmental sustainability, territorial equity, socio-economic inclusion, as well as the political compromises involved. Thus, they can determine whether the food system is genuinely on a path towards transformative change or merely reacting to short-term challenges and enduring obstacles. This study explores several strategies for resilience. They involve farmers, investors, government bodies and NGOs, thus, demonstrating that resilience is a collective issue. We discuss how social organization and the distribution of power among stakeholders impact the resilience of food systems. The question of resilience is not merely technical, it also involves collective action and is, therefore, intrinsically political.

>>> POLICIES NEED TO FURTHER ADDRESS ISSUES OF INEQUALITY, ACCESS TO NUTRITIOUS FOOD AND INCREASING CLIMATE VARIABILITY

The South African government has sought to improve food security, reduce poverty, and tackle inequality. However, it has focused on increasing agricultural production, without effectively addressing structural socio-economic challenges and ensuring environmental sustainability. The inconsistent policy outcomes have revealed potential policy misalignments. National policies predominantly aim to convert emerging Black farmers to intensive commercial farming practices, a strategy fraught with difficulties. Export-oriented commercial farming in BVM is highly competitive and requires significant capital and expertise, posing substantial risks and competitiveness for newcomers. Alternatives, such as developing markets for fresh produce or promoting backyard gardening might offer more immediate relief to impoverished populations. Moreover, the expanding agricultural sector has generated numerous challenges for local governments. For example, the influx of seasonal workers puts pressure on water treatment facilities, water allocation and housing, generating tensions on the ground. While the potential role of local governments has been acknowledged with regard to developing place-based food systems, their capacity is often limited by inadequate human and financial resources, as well as their limited legal authority and political influence. Implementing initiatives is fraught with challenges. In some cases, initiatives rely on the private sector's capacity to respond to urgent risks. This situation highlights the need to reappraise governance and implementation barriers to achieve long-term resilience.



1

Introduction

In recent decades, food systems at the global level have undergone profound shifts. Diverse factors have driven the changes, including escalating food prices, population growth, rapid urbanization, changing consumption habits, soil degradation, the adverse effects of climate change and land disputes. Consequently, the need to improve food systems has been stressed by academic experts and international institutions. The issue was highlighted by the 2021 UN Food Systems Summit, which emphasized the importance of creating sustainable, healthy and equitable food systems.

Concurrently, city-regions are increasingly recognized as key instances in food policy. While the problems they face may not differ significantly from those at other geographical scales (Watson, 2021), they have the potential to pioneer solutions that strengthen the connection between food producers and consumers, thereby bridging the urban-rural divide (Sonnino, 2009). A regional approach aligns with the territorially-based food planning advocated by the FAO (FAO, 2011). The goal is to ensure food and nutrition security, along with other interconnected socio-economic and environmental outcomes, on a territorial level.

In African urban centres, particularly in secondary cities and peri-urban regions, there is growing concern about food and nutrition security in the context of rapid demographic expansion and uneven economic development (Zimmer *et al.*, 2022). This situation challenges the rural focus, which dominates the international food and nutrition security agendas. It calls for approaches that reflect a broader understanding of the food system (Battersby *et al.*, 2019). Concerns about food and nutrition security have emerged with regional transition and the shift from primarily subsistence farming systems and artisanal processing to agri-food systems that produce convenience food products, which are energy dense, but less nutritious. This shift affects all aspects of the food network, ranging from consumer behaviours, retail systems, supply chains to production. Competition for land around expanding cities frequently heightens socio-economic vulnerability, especially for individuals with tenuous or non-existent land ownership or tenancy rights (Van Berkum, 2023).

The challenges are accentuated by growing pressure on public infrastructure and services, the impacts of climate change and the risks introduced by Global Value Chains (GVCs) (Rampa & DeKeyser, 2022). For instance, greater climate fluctuations alter cropping patterns and increase resource competition. The 2018

Cape Town drought is a case in point. It highlights the link between the food, water and energy crises. While GVCs provide employment and income, they can weaken local food systems. By competing for resources, they may cause a disconnect between urban centres and agricultural areas. They can also impact local diets, by exporting nutrient-rich local produce, such as fruit and vegetables (Smit, 2016).

Given these shifts, strategies are needed to ensure the food and nutrition security of growing urban populations, particularly in secondary cities (Riley & Crush, 2023). The **UrbanFosc Project** aims to analyse the changes in urban food systems driven by climate change and increased production for GVCs. This study examines the structure and vulnerability of the food system in South Africa's Breede Valley Municipality (BVM). It focuses on the main urban centre, Worcester, a secondary city with a population of about 130,000. Located in the Cape Winelands District (CWD) in the Western Cape Province (Figure 1), the region is renowned for its specialization in fruit production integrated with GVCs. The BVM is currently experiencing demographic growth, driven by a natural population increase and greater labour mobility linked to the dynamic agriculture sector. A significant share of its agricultural output, including fruit and wine, is exported, primarily to European markets. Yet, the region is grappling with severe malnutrition and climate-related issues linked to water resources. Droughts and rising demand for irrigation are making the situation worse.

This report seeks to examine the primary outcomes of the BVM territorial food system, with a specific focus on food and nutrition security, socio-economic inclusion, water resource management and territorial equity. The study explores the multifaceted vulnerabilities of the food system, especially those triggered by climate fluctuations, the economic risks of GVCs and deficits in energy provision. The findings aim to provide potential insights for public policy, which can be developed in the upcoming collaborative learning process. The study also draws on data collected in 2019 from the earlier Food for Cities (F4C) Project in Worcester¹, interviews with food system stakeholders² and a review of both academic and grey literature. Approximately 30 semi-structured interviews were undertaken with policymakers, private sector representatives, civil society groups and community-based associations. Approximately the same number of interviews were conducted in the context of the Food Learning Journeys in 2022 and 2023.³

1. For more information, see: <http://food4cities.environmentalgeography.nl>

2. This field work was covered by the ethics approval issued by UWC, reference number HS22/8/26. More information on Food4Cities can be found at https://leap-agri.com/?page_id=317.

3. Details of the Food Learning Journeys can be found at: <https://wcedp.co.za/understanding-worcesters-food-system-through-learning-journeys/>; and <https://foodsecurity.ac.za/news/breede-river-municipality-hosts-unique-food-security-learning-journey/>

Figure 1: Location of BVM in the Cape Winelands District, Western Cape



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Source: Municipalities of South Africa

This report addresses the following questions:

- i) What is the structure of the BVM Food System in terms of key value chains and activities, and what are the drivers that shape the system? How does it interact with the broader institutional environment?
- ii) To what extent is the governance of the core food system territorialized, i.e., is it rooted locally in the BVM territory, regionally or is it predominantly linked to broader Global Value Chains?
- iii) How do stakeholders in the food system perceive climate change risks?
- iv) What are the main sources of vulnerability in the BVM food system, and to what extent can it pursue more sustainable and resilient pathways?

The report is structured as follows: Section 2 presents the conceptual and methodological frameworks for analysing the BVM food system. Section 3 explores the multifaceted drivers of the food system, including food consumption, the production environment and the policy strategies that affect the territorial food system. Section 4 discusses the food system's core function, by examining three of the principal food value chains. Lastly, Section 5 assesses the food system's outcomes and resilience in relation to transformative pathways.





2

Conceptual and Methodological Framework

2.1 DEFINING THE FOOD SYSTEM: THE CORE SYSTEM, DRIVERS AND OUTCOMES

A food system includes all the elements and activities related to the *production, processing, distribution, preparation and consumption* of food, as well as the resulting socio-economic and environmental outcomes (HLPE, 2017). Central to these systems are various actors and functions that operate at different levels, influenced by determinants or drivers such as governance structures, technological advancements, environmental factors, and economic conditions. Food systems primarily focus on food security (Caron *et al.*, 2018; DeKeyser *et al.*, 2020; Ericksen, 2008; Ingram, 2011). However, their long-term impacts are more far reaching and include (i) food security, nutrition, and health; (ii) inclusive economic growth, employment and livelihoods; (iii) sustainable resource utilization and environmental preservation; (iv) territorial balance and equity (David-Benz *et al.*, 2022) (Figure 2).

Research on food systems adopts various “entry points.” For instance, the national or regional scale provides a broad overview of food sub-systems and scales (Ericksen, 2008; Hodbod & Eakin, 2015). Some studies highlight local systems and households, focusing on the nexus of farming, livelihoods and food security (Bergamini *et al.*, 2014). Others target the agricultural value chain, exploring its components and governing institutions. However, these tend to focus on individual actors in the value chain, particularly farmers, rather than the other components of the value chain or the interactions between different value chains. Recent literature stresses the need for a more systemic view of the different aspects (David-Benz *et al.*, 2022; Tendall *et al.*, 2015).

Furthermore, many studies highlight the existence of feedback loops, trade-offs and divergent opinions regarding desired outcomes (Bayat *et al.*, 2023). They argue that in order to change the outcomes, actors must modify both external and internal system drivers. Yet, changes may inadvertently affect other parts of the system and generate unforeseen outcomes and trade-offs (Ericksen, 2008; Ingram, 2011). Although the notion of a systemic approach has been widely accepted, its practical application remains limited. Most studies use indicator lists, often neglecting a holistic system analysis (David-Benz *et al.*, 2022). Nonetheless, the frameworks used to explore complexity, such as **socio-ecological systems**, have been criticized for possibly neglecting political dynamics (Cote & Nightingale, 2012; Helfgott, 2018).

2.2 EXAMINING OUTCOMES FROM A TERRITORIAL PERSPECTIVE

Most discussions about how a food system approach can be applied in terms of practical actions have

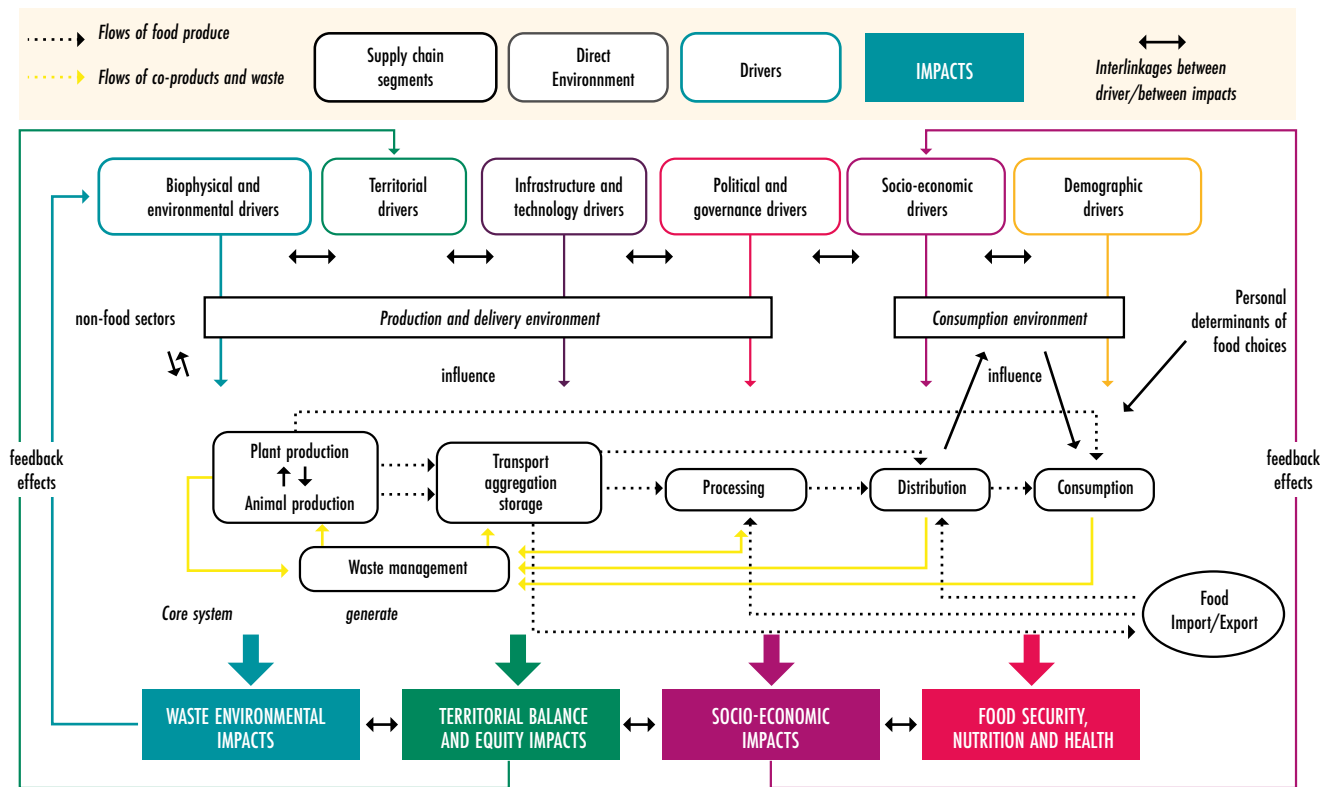
primarily taken place at the macro-level (Feola, 2015). Discussions tend to be abstract and emphasize the desired outcomes of transformative processes (Sonnino & Milbourne, 2022). Various outcomes are presented in the literature, with an increasing emphasis on the territorial level as a pathway to practical implementation. David-Benz *et al.* (2022) outline the four above-mentioned interconnected goals from a territorial viewpoint. They recognize that the performance of food systems varies, depending on the local agricultural and socio-ecological context. Their work adds to an ongoing discussion about food planning at the territorial level and the connection between urban and rural areas (FAO, 2011). Although a comprehensive review is beyond the scope of this report, some key points are worth highlighting.

First, in the 1990-2000s, the dense literature on *food localization* presented local food products as sustainable alternatives to the challenges posed by agricultural industrialization (Kloppenborg *et al.*, 2000). Proponents of food localization stressed the reduced environmental impact, with reference to ‘food miles’ and the carbon costs of global distribution (Pretty *et al.*, 2005). Local food products, influenced by unique environmental factors, were considered to be of superior quality (Barham, 2003) and to foster trust between producers and consumers (Feenstra, 1997). In this context, the *re-localization* of food systems was seen as a strategy to empower and promote the uniqueness of local products. This approach integrated territoriality and governance in the ‘embeddedness’ concept and underlined the state’s role in supporting local food markets (Sonnino, 2013).

However, the idea that the re-localization of food systems is inherently beneficial was challenged by critics of the “*local trap*” (Campbell, 2004). This critique is based on three primary concerns: (i) Local food systems are not always environmentally sustainable, for example some local practices may incur greater environmental costs than importing products (Born & Purcell, 2006; Winter, 2003); (ii) Local systems may exacerbate social disparities, with platforms like farmers’ markets potentially excluding less affluent consumers and producers (Hinrichs, 2000); and (iii) Locally-sourced foods are not necessarily healthier, for example producers may make compromises with regard to nutritional quality due to various constraints (Born & Purcell, 2006). Consequently, assessing the sustainability of food systems requires **a comprehensive approach that evaluates the entire food supply chain, not simply the food’s origin.**

Recent literature emphasizes the need to develop empirical studies on “*alternative food networks*” beyond isolated cases (Sarmiento, 2017). Alternative initiatives include community-supported farm groups, farmers’ markets, community gardens and various marketing schemes that have become more prevalent in Western countries in recent decades. Scholars are

Figure 2: Food system conceptual framework



Source: David-Benz et al. (2022)

developing frameworks to address the issue of spatial complexity (Bosco & Joassart-Marcelli, 2018). Similarly, Lamine et al. (2019) proposed a “territorial agri-food systems approach” to examine global impacts on territorial scales. This involves an in-depth analysis of the ability of various initiatives to promote fair and sustainable transitions.

In contrast, Sonnino and Milbourne (2022) advocate using a «place-based» framework to navigate the traditional spatial dichotomies in food systems, specifically the global/conventional versus local/alternative divide. They suggest considering food policy outcomes in terms of (i) the **co-benefits** between economic, social and environmental objectives; (ii) the **linkages** between urban, peri-urban and rural areas; (iii) the **inclusion** of citizens in policy development; and (iv) the **connectivity** between food systems and other sectors. One of the key features of their framework is the idea that the *surrounding rural areas should be viewed as an essential component of the urban food system* and, thus, a region to be nurtured rather than exploited.

Lastly, a territorial (or place-based) approach to the food system emphasizes that the role of stakeholders is not merely to produce, distribute and consume food in markets. These stakeholders reside in places where the potential, constraints, and plausible futures of that location matter. In these places, solutions to challenges

can emerge through collective action. This approach underscores the multi-dimensional nature of the food system, the diversity of actors, their different levels of action and the need for coordination. Consequently, the territorial approach is consistent with food system resilience because it facilitates adaptation to change and effective risk management (Losch & May, 2023).

>>> 2.3 THE RESILIENCE OF THE FOOD SYSTEM

The food system has to cope with different challenges and shocks. Some are immediate, such as weather disturbances and disease outbreaks, some are more long term, like climate change and biodiversity loss. These different challenges often intersect, which magnifies their impacts and may lead to potential trade-offs between outcomes, such as food security, environmental sustainability and stable livelihoods (Peters et al., 2021). For example, soil degradation can exacerbate the impact of weather events on crop yields, which may affect stakeholders in different ways. Similarly, food supply chains have to deal with uncertainty due to fluctuations in market demand, disturbances that affect the flow of products within the value chain and value added. While the concept of food system resilience has gained prominence, methodological issues persist (see Box 1).

Box 1: Food System Resilience

Originating in ecological studies (Holling, 1973), the notion of resilience has since been adapted to social-ecological systems to indicate a link between social and ecological vulnerabilities (Adger, 2000; Folke *et al.*, 2010). Vulnerability, as defined by Adger, is related to how social and environmental changes stress groups or individuals (Adger & Kelly, 1999; Neil Adger, 1999). It focuses on factors like gender, age, ethnicity and socio-economic status, which affect the resilience of communities or households to livelihood shocks. This concept clarifies why some communities or individuals are more vulnerable than others (Cutter *et al.*, 2009). Here again, the critics of socio-ecological systems highlight the need to recognize and challenge power structures and to acknowledge the capacity of individuals to actively shape their own future (Cinner & Barnes, 2019).

Resilience is often perceived as a paradigm, rather than a concrete theory (Anderies *et al.*, 2006). It is sometimes described as a “loosely organized cluster of concepts” (Carpenter & Brock, 2008), and definitions vary across disciplines (Barrett & Constanas, 2014; Brand & Jax, 2007; Speranza *et al.*, 2014). One of the prevailing definitions is a system’s *ability to endure, absorb and adapt to shocks and disturbances, including unforeseen ones* (Anderies *et al.*, 2013; Tendall *et al.*, 2015). Moreover, a system’s resilience includes features such as diversity, redundancy, connectivity and the capacity to self-organize and learn. This perspective has evolved from a static interpretation to one that acknowledges the existence of dynamic shifts and multiple equilibria (Córdoba *et al.*, 2020). Notably, the ‘tipping points’ highlight how minor alterations can trigger significant system transformations, as seen in events like the 2008 food price crisis (Gregory & Ingram, 2009).

Resilience and sustainability are complementary concepts (Maleksaeidi & Karami, 2013). Sustainability focuses on a system’s endurance and ability to function over time, whereas resilience highlights its adaptability to disturbances. In other words, sustainability addresses system performance and resilience enables a system to perform in the face of challenges (Anderies *et al.*, 2013; Brand & Jax, 2007). The resilience framework is primarily conceptual and lacks consensus with regard to measurement methods and definitions for various components. However, some studies have aimed to establish a rigorous, food-specific framework centred on end-consumer food security (Stone & Rahimifard, 2018; Vroegindewey & Hodobod, 2018). Importantly, resilience is a latent variable, which means it cannot be captured using a single metric. Despite advances to develop metrics that can be generalized, the debate continues. In addition, evaluating resilience often requires extensive socio-economic and agricultural data (Béné & Devereux, 2023; Béné & Doyen, 2018; Jones, 2019).

From a qualitative perspective, Helfgott (2018) **proposes four questions to guide the analysis of resilience, which also inform our report:** (i) *What is being assessed for resilience?* This ranges from specific components, like soil to broader outcomes, which often emphasize societal concerns, such as food security. (ii) *What challenges resilience?* This includes immediate shocks, such as weather events or long-term pressure, like dietary changes.

(iii) *Whose perspective of resilience is considered?* Balancing individual stakeholders and larger entities brings to light power dynamics, equity and trade-offs. (iv) *What time frame is used to analyse resilience?* Differentiating between short-term disruptions and long-term shifts is crucial, since short-term strategies may compromise long-term resilience.

Drawing on the interplay between resilience and sustainability, Tendall *et al.* (2015) highlight the temporal aspect of resilience. They caution against inadvertently reinforcing systems that may cause environmental damage or socio-economic inequality. Their approach examines resilience by considering various components, such as: (i) **robustness**, ensuring stability and absorption capacity against external shocks; (ii) **recovery**, highlighting a system’s rapid post-disturbance restoration, and (iii) **transformation** (or reorientation), focusing on adapting to alternative food system outcomes, either proactively or post-disruption. Some authors distinguish between minor incremental adjustments and deeper transformative changes (Wilson *et al.*, 2020).

Drawing on a literature review, this report presents a qualitative assessment of the trajectory and resilience of the BVM food system. The key resilience principles identified in the literature are used as guidelines: **diversity/redundancy, connectivity and adaptability**. These principles are defined and discussed in detail in Section 5.3. Wood *et al.* (2023) grasped the extent to which the resilience of food systems depends on interactions and drivers across scales. Thus, they identify key tension points in the local-global debate. They suggest that incorporating resilience principles into food system management and governance at all levels has the potential to bring about transformative change to enhance food system resilience.

2.4 METHODOLOGICAL CHOICES

Based on the literature review and the objective to balance complexity, key empirical concerns and the operationalization of food system analysis, this study makes specific methodological choices for examining the BVM food system as follows:

1) Core Food System: Using the core food system as described by David-Benz *et al.* (2022), we select three key food value chains, whose production and/or consumption environments are located in the BVM: table grapes (international), chicken (national) and pumpkin (local). The selection criteria for these VCs are related to: i) their potential to illustrate the diversity of local, national and global VCs, which structure the BVM food system, as well as the related multidimensional dynamics that impact food and nutrition security; ii) their potential to create jobs, produce food, their dietary significance for diverse population groups and issues linked to their environmental footprint.

Hence, the analyses and results presented in this report constitute key stylized facts rather than a representation of the entire BVM food system and its overall resilience. The three VCs were selected on the basis of preliminary fieldwork conducted in the BVM in April 2023 and an analysis of the 2017 Agricultural Census (Stats SA, 2020). We identify the primary actors and activities in the selected VC using secondary data and on-site interviews. The core system is characterized by flows of money, inputs, information, food, food waste and co-products. However, it is important to note that our analysis of these elements is not exhaustive.

2) Food System Drivers: We provide an overview of the prevailing food system drivers, including food security, agricultural policies, demographic shifts, the food production environment and the consumption environment. The term “food production environment” denotes factors that have a direct influence on production opportunities, such as inputs, equipment and infrastructure. Conversely, “food consumption environment” captures key facets of consumption: purchasing power, food availability, preferences and sales outlets (David-Benz *et al.*, 2022). The overview includes essential statistics and trends pertaining to food consumption, production and flows in the area. We primarily draw on quantitative data from the F4C Database (Davis *et al.*, 2022) and research in the literature. Furthermore, we use existing spatial data to develop a comprehensive narrative of food systems at a territorial level.

3) Outcomes and Interconnections: We consider the value chains in terms of the outcomes proposed by David-Benz *et al.* (2022): food and nutrition security, environmental footprint and conservation (water), territorial balance (informal settlements), and socio-economic effects (employment). Outcomes are often interrelated. For example, food security is not only contingent on food availability and sustainable resource management. It also depends on factors such as employment, income and purchasing power, which influence economic access to food. In addition, these outcomes may influence food system drivers through feedback loops. For instance, creating jobs draws migrants, which increases pressure on food systems when access to and competition for resources are already an issue.

We examine these outcomes from a territorial perspective, with a focus on the *linkages* between Worcester, surrounding BVM areas and the rural regions in Western Cape. The analysis will also delve into the *connections* and *competition* between the specific value chains targeted, their implications for water use and employment, as well as the potential complementarity or concurrence between local and international value chains.

4) Vulnerability Factors: We review the main vulnerability factors that impact the value chains and food-insecure communities. Indicators of vulnerability tend to highlight the food system’s risk exposure. They cover issues, such as water use and availability in a context of climate variability, export revenue dependence, production and supply chain diversity, and marketing strategies.

However, indicator-based methods for assessing vulnerability have been criticized because of the methodological issues involved in indicator selection, standardization and weighting (Barnett *et al.*, 2008; Eriksen & Kelly, 2007; Füssel, 2007). The dynamic nature of vulnerability is an additional challenge. To overcome this, our approach includes qualitative methods, such as oral narratives. This improves our understanding of the evolution of vulnerability within local systems, which is crucial for tackling scale-related challenges in vulnerability assessments (Barnett *et al.*, 2008). National and regional assessments have certain limitations when it comes to informing local policy. Thus, our study uses a multi-scale approach (regional, district and household levels), to collect empirical data on factors, which key stakeholders identify as driving vulnerability. Our research specifically explores factors, such as climate variability, water and land availability, and other perceived risks.

5) Resilience Principles: Lastly, we examine the resilience of the BVM food system in terms of its **capacity to maintain or improve outcomes** in response to shocks. Based on the guiding questions presented by Helfgott (2018), our analysis focuses on climate change, which is considered to be the main disruption, alongside the urgent short-term risks it poses for the core food system stakeholders and food-insecure populations. To do so, we draw on the key principles: diversity/redundancy, connectivity and adaptability in relation to the main actors and activities involved in the food system. We identify the strategies implemented in BVM, which are aligned with these principles, and highlight potential trade-offs, interrelations and conflicts. By drawing on the literature review and interviews, we aim to provide a comprehensive overview of food system resilience, as well as insights into the potential for developing transformative resilience pathways.

6) Place-based: A place-based approach reveals the dynamics of a food system, even if the notion of local food production and consumption may seem somewhat of an oxymoron in today’s globalized food system. Local consumption preferences and options are influenced by multinational production choices. Similarly, local production choices are shaped by consumer preferences and governance systems in other hemispheres. The system is highly financialized: decisions relating to consumption and production are influenced by imperatives that have nothing to do

with food and nutrition security, sustainability or local livelihoods. Nonetheless, local politics, cultures, geo-spatial and environmental conditions continue to be important (Bérard & Marchenay, 2007; Broad Leib, 2013; Peters *et al.*, 2009).

Local dynamics can be analysed in the framework of the BVM's administrative boundary. The notion of foodsheds provides an alternative framework (Peters, 2022). These consist of place-based curated conversations between stakeholders, including researchers and policy-makers. By providing a safe space for co-learning for all participants, they are rooted in a constructivist approach to learning. This allows stakeholder engagement to be linked with research design to increase research impact. A foodshed is an aspiration, rather than a geographic space where food is produced and consumed (Kloppenburg *et al.*, 1996). It refers to both actual and potential relationships between producers, consumers and the physical and cultural environment in which they live. However, definitions and operationalization are still being discussed.

We have opted for a pragmatic approach, given the available data and our focus on understanding responses to climate change. Food consumption data have been sourced from our Dietary Intake Survey, conducted in Worcester in 2019/20 and described in Davies *et al.* (2022). Total consumption was calculated

on the basis of: the reported dietary intake in the 2019/20 survey; and the food expenditures reported in the most recent Living Conditions Survey, conducted by Stats SA in 2014/15 following Carriquiry (2003), with estimations for each population group. These values were converted to quantities of food purchased (in tons), using data collected for the consumer price index, and to kCal, using the methodologies adopted by the National Poverty Line rebasing exercise from 2014. Details of this methodology are described in Stats SA (2015). Food production data was drawn from the 2017 Agricultural Census.

The boundary for a local foodshed for the BVM was set at 160 km from the centre of Worcester, corresponding to the '100 mile limit' proposed (Figure 3) (Schreiber *et al.*, 2021). In the context of the BVM, this boundary approximates to the "Boland", a 'vernacular region' (territories loosely defined by people's perceptions). It includes most of the mountains and valleys in the central Western Cape. On an administrative level, the foodshed covers 23 of the 30 municipalities in the Western Cape. It produces 92% of the province's agricultural produce. For the purposes of this report, the WC province is used as a proxy for the BVM foodshed.

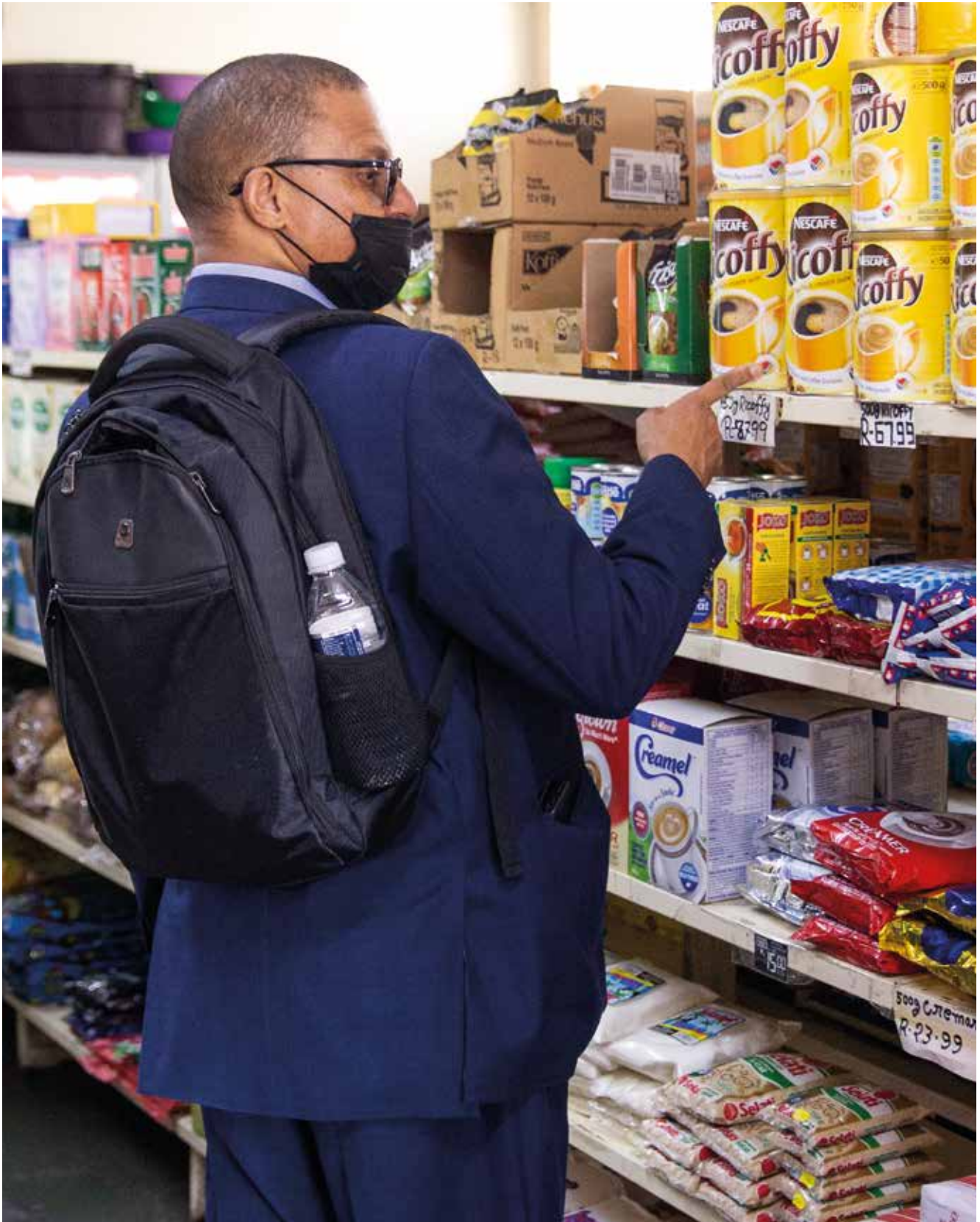
As a final note, a comprehensive analysis of the policy process is beyond the scope of this report and is dealt with elsewhere (Greenberg *et al.*, 2023; Misselhorn

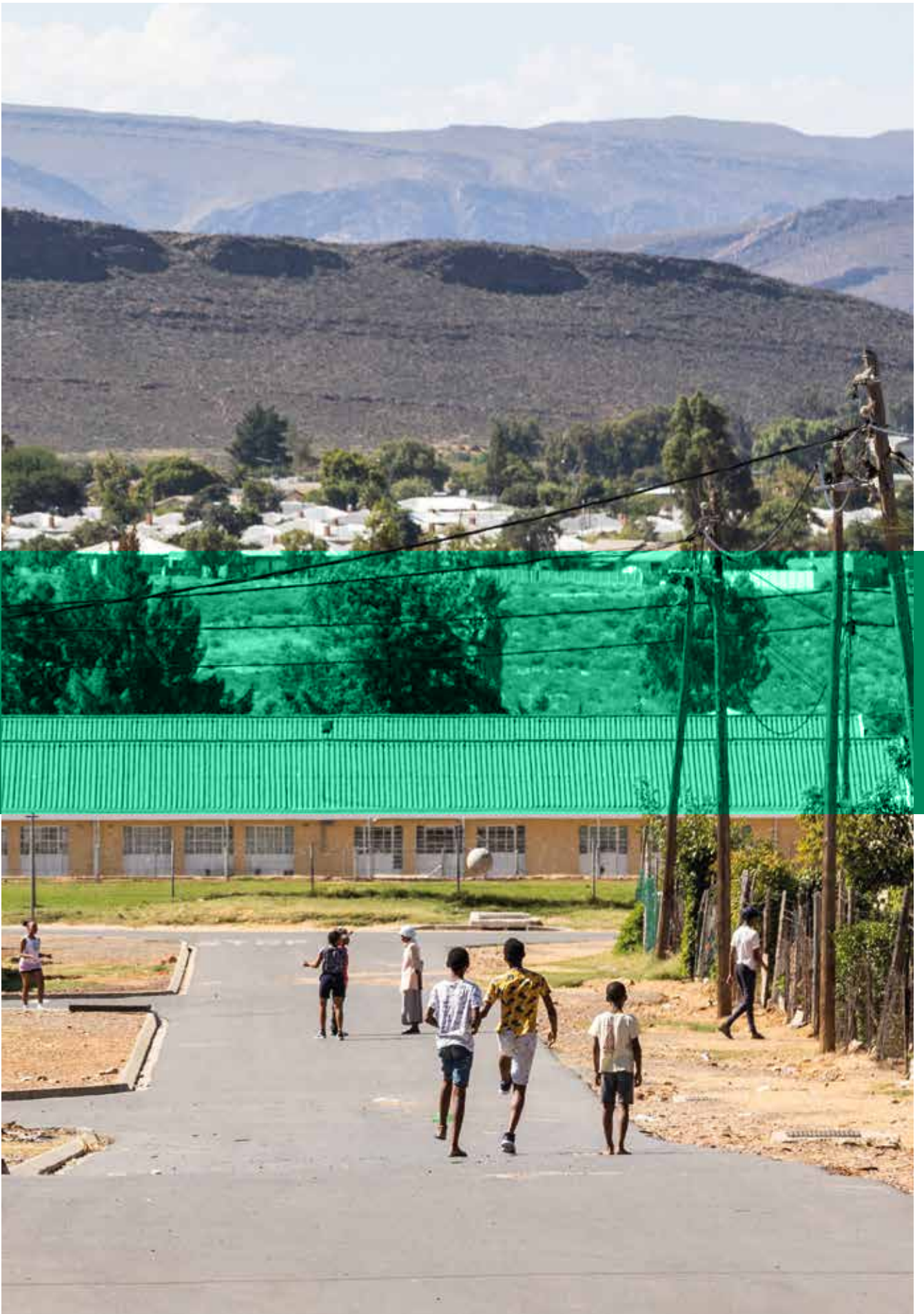
Figure 3: Map of the BVM administrative boundary, the Cape Winelands District, the 100-mile foodshed and the Western Cape Province



Source: Google Earth, 2024.

& Hendriks, 2017). Nonetheless, the interviews conducted shed light on the challenges involved in designing and implementing policies to promote more sustainable and resilient food systems.





3

Food System Drivers: Historical Legacy and Integration into the Global Food Economy

The South African food system is complex. It is characterized by a dualistic agrarian structure and significant socio-economic disparities. Poverty, inequality, hunger, undernutrition and rising obesity rates are prevalent, despite the country's relatively high per capita income (Greenberg, 2017; Kushitor *et al.*, 2022; FAO/EU/CIRAD, 2022). The BVM food system is a case in point. There is a dichotomy between the formal, commercial sector linked to global agribusiness and financial systems, which offers a diverse array of affordable food products, and the numerous marginalized, small-scale Black farmers and informal vendors, who operate with slim profit margins (Termeer *et al.*, 2018). This section examines the primary factors shaping the BVM food system. We discuss the national policy landscape and key socio-economic trends. We then examine consumption patterns, food availability and the production environment.

>>> 3.1 POLICY LANDSCAPE

Food Policy: A Focus on Agricultural Production

In post-Apartheid South Africa, the government introduced various policies to improve food security, signalling a commitment to ensuring better access to food. The Department of Agriculture, Land Reform and Rural Development (DALRRD, former DAFF) has been at the forefront, encouraging agricultural growth by providing resources and training for primary production, processing, as well as land reform. In partnership with the Department of Social Development (DSD), it supports the constitutional "right to food." Various measures were implemented, such as the National Treasury's decision in 1994 to make staple foods tax-exempt and the launch of the National School Nutrition Programme. The 2002 Integrated Food Security Strategy (IFSS) set an ambitious target to eliminate hunger by 2015, with a focus on rural communities.

These objectives were reaffirmed in the **2012 National Development Plan (NDP)**. The NDP outlined ambitious goals to eradicate poverty, reduce unemployment and tackle inequality by 2030. To improve food security, the NDP highlighted strategies, such as improving irrigation, security of land tenure and nutritional education. The 2010s saw the introduction of key policy frameworks, including the 2013 National Policy on Food and Nutrition Security and the 2017 Strategic Plan for the Department of Agriculture. The latter also aligned with actions in the Industrial Policy Action Plan and Medium-Term Strategic Frameworks. The 2022 Agriculture and Agro-processing Masterplan provided an additional framework to establish 4,400 hectares of new irrigated land with the elevation of the

Brandvlei Dam wall. It set targets to create 4,217 jobs and support livelihoods with table grape production. The plan seeks to open up new markets for table grapes in South Korea, Vietnam, the Philippines, as well as Japan and Mexico.

Lastly, the agricultural policy strongly emphasizes land reform, focusing on land restitution, redistribution and improving security of tenure. Programmes, such as Land Redistribution for Agricultural Development and the Proactive Land Acquisition Strategy were developed to direct state efforts towards redistribution. Their aim was to benefit the poor and encourage supply-driven land acquisition. To support these policy initiatives, economic development programmes were launched, such as: the Broad-Based Black Economic Empowerment Framework for Agriculture (AgriBEE); financing schemes through the Micro Agricultural Financial Institutions of South Africa; and the Comprehensive Rural Development Programme. All the programmes aimed to foster economic growth.

However, the impact of these policies on food and nutrition security has been inconsistent. This situation highlights the need for a thorough reassessment of their effectiveness in combating structural inequality (Hendriks & Olivier, 2015; Taylor *et al.*, 2015). Adeniyi *et al.* (2021) reveal that the household food and nutrition insecurity in South Africa is high compared to economically similar nations, despite being considered food secure with a surplus relative to dietary needs. These striking results contrast with a sophisticated food policy, which is deeply rooted in the state's long-standing interventionist tradition.

Research suggests that most government policy measures focus on increasing agricultural production, rather than tackling the fundamental food insecurity challenges, namely, the underlying problems of structural poverty, inequality and environmental degradation (de Klerk *et al.*, 2004; Kushitor *et al.*, 2022; Termeer *et al.*, 2018). Programmes to develop farmer education, extension services and cash crops have downplayed the importance of meeting food consumption needs. This has generated criticism about the potential impact of empowering smallholder farmers. Furthermore, although the NDP emphasizes economic access and employment in the food sector, it **has neglected the issue of nutritional quality** (Termeer *et al.*, 2018).

In the Western Cape, the agricultural sector has experienced robust growth, recording a 44.9% increase between 2012 and 2021, with a 36% surge in exports. The sector's growth rate surpasses that of other industries in the region (PERO, 2022). This highlights the major role of agriculture and export-oriented production in the local economy. Policy measures increasingly focus on enhancing market access, consistent with the regional goal of fostering

job creation through export-driven growth. Various stakeholders are working alongside the government, including commodity groups and organizations, such as the South African Table Grape Industry (SATI), the Wine & Agricultural Ethical Trade Association (WIETA), the South African Wine Transformation Unit (SAWITU), Wines of South Africa (WOSA), Hortgro and the Fresh Produce Exporters Forum (FPEF). The Cape Agency for Sustainable Integrated Development in Rural Areas (CASIDRA), an essential partner of the Provincial Department of Agriculture, facilitates the implementation of these programs.

In this context, the Provincial Department of Agriculture is striving to tackle the complex challenges of land planning and reform. The NDP implemented several policies to bring about and finance land reform, but fell short of its goal. Instead, primary agricultural production and its broader value chains were concentrated further (see Section 3.4). The initial policy objectives altered with the shift towards the use of tools to help develop inclusive business models. Similarly, with the water policy reform and the redistribution of former “water rights”, the disparity remains. Twenty-five years after the reform Act was passed, water allocation is still very skewed and struggles to redress past unbalances. In fact, 75% of water is granted to White farmers and a mere 25% to former historically disadvantaged individuals (HDI).

The Department of Water Affairs (DWA) has attempted to tackle the redistribution strategy, by applying different policy measures. For instance, permission is required to build a dam or distribute additional volumes of water from an existing dam; a water licence is more likely to be granted when the application can demonstrate that HDI (mainly Black and Coloured farmers) will not be left out, but will also benefit from the project’s allocation of water to irrigate their land. In May 2023, the DWA submitted a draft regulation to the National Water Act, presenting a more equitable share of the water resources. Their proposal was to allow water licences on condition that Black farmers could be issued shares in the agricultural business. This requirement increases expansion costs because it involves granting free shares to farm workers.⁴ Following a huge outcry from the main farmers’ union (Agri SA), the regulation was amended and applied to new licences or licence renewal (water licences usually have a 20-year time limit). In addition, the Broad-Based Black Economic Empowerment component (BEEE) regarding owning shares in the farming business appears to have been abandoned. Instead, a broader all-encompassing definition prevails, showing how former HDI might somehow benefit from the project.⁵ Table 1 provides a brief overview of the agricultural and food security programmes underway in the Western Cape.

4. Interview, researcher at the University of Cape Town, April 2023.

5. Interview, BOCMA water use specialist, Worcester, March 2024.

Growing Concerns Over Food Consumption and Income

Food and nutrition insecurity persist in South Africa, with existing programs focusing on rural production and overlooking urban malnutrition (Boatema *et al.*, 2018; Devereux & Waidler, 2017). However, policy approaches are shifting towards integrating employment, income generation, price regulation and social welfare programmes. These integrated strategies are reflected in national interventions, such as feeding programmes and social assistance grants. Notably, the National School Nutrition Programme (NSNP) and Early Childhood Development (ECD) centres provide essential food support for children. It is also worth mentioning that civil society organizations have a key role in food assistance and training.

Nevertheless, policymaking and implementation have faced setbacks. Tensions related to implementation include fiscal constraints, as debt costs have been rising. However, government expenditure on agriculture has not increased in the past two decades (FAO *et al.*, 2022). Furthermore, the Department of Health is tackling issues of undernutrition, obesity and chronic diseases using various regulations and programmes. However, there are gaps in service delivery for those outside the educational or hospital settings. The situation continues to be challenging in the agricultural and agro-processing sectors, despite job creation initiatives. Employment in agribusiness has been declining and the temporary nature of jobs in economic access programmes has done little to reduce unemployment and poverty (J. Theron & Visser, 2012; Visser & Ferrer, 2015). This suggests that economic and geographic factors are inextricably linked to food access. The situation calls for a more nuanced and effectively implemented policy approach (Boatema *et al.*, 2018).

Over and above public employment programmes, agricultural labour policy has been a focal point since the end of Apartheid, especially in the Western Cape Province and BVM. A series of regulatory changes were intended to protect labour rights, for example, the Basic Conditions of Employment Act, the Labour Relations Act and the Extension of Security of Tenure Act (ESTA). These laws aimed to improve conditions for farm workers, but their inconsistent implementation has generated mixed outcomes (Webb, 2017). For example, in 2008 and 2013, there were intense protests and strikes over working conditions for farm labourers and broader labour issues in the BVM region. The tensions were partly triggered by the 1997 Labour and Minimum Wages Act and land rights issues linked to

Table 1: Overview of agricultural and food security programmes in the Western Cape Province

Programme and Sub-programmes	Overall Objective	Main instruments
<p>Sustainable Resource Use and Management</p> <ul style="list-style-type: none"> • <i>Agricultural Engineering Services</i> • <i>LandCare</i> • <i>Land Use Management</i> • <i>Disaster Risk Reduction</i> 	<p>Deliver sustainable resource management by offering agricultural engineering and LandCare services, fostering proactive engagement, facilitating project implementation and knowledge transfer to stakeholders.</p>	<ul style="list-style-type: none"> • Provision of facilities • Design of and training for irrigation systems • Planning of infrastructure • Implementation of a digital monitoring platform (Fruitlook) • Service for planning mechanization • Planning for conservation • Subsidies for soil conservation measures • Projects for conservation farming • Development and oversight of the SmartAgri Plan by the SmartAgri Steering Committee
<p>Agricultural Producer Support and Development</p> <ul style="list-style-type: none"> • <i>Producer Support Services</i> • <i>Extension and Advisory Services</i> • <i>Food Security (pillar one of Food Integrated Food Security Strategy)</i> 	<p>Strengthen land reform programmes by building institutional capacity, providing support to both new and established farmers, and attracting private sector investment.</p>	<ul style="list-style-type: none"> • Farm Assessment Report • Direct Support and Training for Black Smallholder and Commercial Farms • Extension and Advisory Services for Smallholder Farmers • Establishment of Household and Community Gardens (implemented by CASIDRA)
<p>Rural Development</p> <ul style="list-style-type: none"> • <i>Rural Development Coordination</i> • <i>Social Facilitation</i> • <i>Farm Worker Development</i> 	<p>Coordinate integrated development programmes with stakeholders to enhance service delivery, ensure access to government services and promote safety in rural agricultural communities, contributing to a stable and secure food supply.</p>	<ul style="list-style-type: none"> • Regional Coordination Committees • Agricultural Worker Household Census • Dialogue with the industry regarding working conditions and access to services
<p>Agricultural Economics</p> <ul style="list-style-type: none"> • <i>Agri-processing support</i> • <i>Marketing and Agribusiness</i> • <i>Production Economics</i> 	<p>Bolster the agricultural sector's growth and maintain export performance to enhance its contribution to the provincial economy by increasing income, improving job security and encouraging job creation.</p>	<ul style="list-style-type: none"> • Agrihub in Elsenburg and Agripark in Witzenberg in the CWD • Training in agro-processing • Facilitation of market access • Promotion of products at exhibitions • Trade expansion by promoting investment • Initiatives to improve compliance with local and international standards
<p>Food and nutrition security (FNS)</p> <ul style="list-style-type: none"> • <i>Food assistance</i> • <i>Food awareness and safety</i> • <i>Food sensitive planning</i> • <i>Food resource management</i> • <i>Inclusive food economy</i> • <i>Food governance</i> 	<p>Use a food systems approach to balance social and economic interventions for FNS by protecting communities, at the same time as addressing the underlying issues that shape the food economy.</p>	<ul style="list-style-type: none"> • Structured co-learning processes to improve policy and implementation • Three pilot sites established, including the BVM • Area-based Early Childhood Development (ECD) centres to improve childhood nutrition • School and community gardens • One Home: One Garden

the Extension of Security of Tenure Act (ESTA) (Freeman & Leandri Pretorius, 2017). However, despite the protests, working conditions for farm labourers did not improve and issues were not fundamentally resolved. Hence, measures to achieve social justice and equality are still necessary (Devereux, 2020; Mackay, 2018).

Addressing Environmental Vulnerability

Environmental changes are key factors of vulnerability of the agricultural sector to climate change, with water resource availability and crop resilience being major concerns. Carter & Gulati (2014) have reported the uneven distribution of water in South Africa, where

60% of water is sourced from only 20% of the land. This is a critical issue for agriculture. Indeed, more irrigation is needed to meet food production requirements, but it might overburden water and energy supplies (L. M. Pereira *et al.*, 2014). Farmers are adjusting their practices to mitigate the environmental challenges, but isolated actions are insufficient (Carter & Gulati, 2014). Termeer *et al.* (2018) stress the importance of comprehensive water conservation and climate policies for sustainable food systems.

In South Africa, climate and water policies are closely intertwined, as highlighted in the National Climate Change Response Paper (NCCRP) of 2011. The NCCRP recognizes that climate impacts, including temperature changes, are inextricably linked with water shortages, human and animal health, agriculture and extreme events, such as fires, floods and droughts. These connections have steered the creation of sector-specific policies since 2012. The Water Policy, significantly influenced by private sector funding, underscores the role of microfinance institutions and climate finance in tackling the challenges brought about by climate change, especially in the case of water management (Khavhagali *et al.*, 2023). Additionally, Bourblanc (2017) describes the complex interactions between various narratives and approaches in South African water policy. These reflect a balance between quantitative supply-side management and qualitative aspects, such as water quality, efficient use and sustainability.

Initiated in 1997 by the DALRRD, the LandCare programme addresses natural resource degradation and its link to rural poverty. It focuses on sustainable farming, food security, job creation and improved living standards, especially in the former Homelands (DAFF, 2002; 2011). However, a shift towards sustainable farming and conservation agriculture in the 2000s has narrowed its scope (DAFF, 2011; Mulder and Brent, 2006). The programme also fosters public-private partnerships, such as the African LandCare network (DAFF, 2011). Yet, it has been criticized for imbalanced funding and the fact that the agricultural sector has a disproportionate influence in the partnerships. Initially, bureaucratic inefficiency also hampered its implementation (Mulder & Brent, 2006). In addition, the SmartAgri Plan, a strategic initiative launched by the Western Cape Department of Agriculture, aims to bolster the region's agricultural resilience to climate change. This will be discussed further in section 5.

The **integration of natural resource management with poverty reduction strategies** has tremendous potential. Yet, achieving long-term sustainability requires a genuine commitment on the part of South Africa's historical and socio-political structures. The prevailing issues of poor leadership and inadequate budget allocations are seen by several scholars as symptomatic of a broader indifference regarding

transformative land management practices (Termeer *et al.*, 2018).

Challenges to a Food-System Policy Approach

There is a growing consensus among academics about the need for a comprehensive policy approach to balance outcomes within the food system. This involves fostering stakeholder relationships and linking the food sector with other critical areas, such as energy, water and transport. Studies highlight the relevance of city-specific and cross-sectoral strategies that include food justice (Sonnino, 2022). Tackling food insecurity means confronting deep-rooted interests and the established political and bureaucratic status quo within the food system (Termeer *et al.*, 2015). Similarly, recent academic studies increasingly perceive policy fragmentation as a political challenge. Several scholars suggest that institutional factors and stakeholder negotiations play a more important role than rational decision-making in policy integration (Weitz *et al.*, 2017).

South Africa clearly needs coordinated food and nutrition security policies to enhance cooperation between different levels of government and stakeholders. However, integrated food strategies often fall short of targets (Pereira & Drimie, 2016). Attempts to set up a Food and Nutritional Security Council have stalled. Existing governance structures address food insecurity in isolation and focus on department-specific issues. Various examples include the DALRRD's agricultural initiatives, the Department of Basic Education's nutrition programmes and the Department of Social Development's 'food for all' campaigns. The problem is not policy design or knowledge. The challenge is to make sure that ambitious policy goals are aligned with administrative capacity and political contexts (Termeer *et al.*, 2018).

Political issues also hinder cross-sectoral cooperation, as departments compete for resources and pursue specific goals. Political agendas and mandates often overshadow less visible issues, such as nutrition (Ezezika *et al.*, 2021). Thow *et al.* (2018) identified three conflicting policy coalitions in South Africa, which affected food supplies, security and nutrition policies. Each coalition acknowledges the government's attempts to juggle competing priorities, but they disagree on how food and nutrition issues should be framed. This undermines policy coherence, especially when economic and health policies clash. A case in point is the policy to promote value-adding and job creation versus fresh, unprocessed foods. The economic coalition is backed by the National Development Plan and major food supply policies. It also enjoys support from the food industry, a recognized force in both the economy and policymaking.

The multisectoral committees' roles are ambiguous, which also complicates any attempt at coordination (Kushitor *et al.*, 2022; Michaud-Létourneau & Pelletier, 2017). Despite their potential for policy innovation, cities and regions are struggling to develop comprehensive food policies because they lack political authority and the resources needed to implement measures. Complex socio-economic trends also affect the policy environment, as described below.

»»» 3.2 UNEMPLOYMENT AND LABOUR MOBILITY

The Western Cape has witnessed significant demographic changes over recent years. The number of households has increased in line with population growth. In 2020, the province recorded approximately 1.96 million households, up from 1.5 million in 2010. The CWD accounted for about 19% of the total population. This demographic expansion reflects a dynamic region undergoing significant changes, including labour-related migration. Inevitably, this migration affects various aspects of life, which has an impact on economic, social and environmental sectors. The CWD is a crucial part of this province. It plays a significant role in demographic dynamics, by contributing to the province's overall growth and development (WCDoA, 2022).

In the 1990s and early 2000s, there was a severe employment crisis in South Africa. This was driven by an increasing labour supply in the Black population and the restructuring of primary sectors, coupled with a rapid decline in working conditions (Burger & Woolard, 2005). In the Breede Valley, job creation was slow in both formal and informal sectors, coupled with a decline in agricultural jobs, particularly in grape production in the Hex Valley, mainly due to a shift towards seedless grape cultivars requiring. These cultivars require less labour, which reduces production costs (Soreaso, 2012).⁶ The new labour laws increased production costs (higher minimum wage), which speeded up the eviction of farm workers and led to a rise in casualization and mechanization (BFAP, 2012).

In the 2010s, national job losses continued, driven by various factors, including drought. All sectors were affected by load shedding and economic recession. BVM was no exception. As of 2019, BVM had the second-lowest GDP per capita in the CWD, at R63,334. This was significantly below the average figures for the district and province, R72,778 and R84,967, respectively. Income inequality in BVM deteriorated

between 2014 and 2020. The Gini coefficient increased from 0.58 in 2014 to 0.61 in 2020 (WCG, 2021). The annual increase in BVM's population, particularly among socio-economically disadvantaged groups, surpasses the growth in job opportunities in the area (Bureau for Economic Research, 2011; WCG, 2021). As of 2022, Breede Valley's population reached 196 200, making it the second most populous area in the CWD (WCG, 2023). The growth is attributed to a natural population increase and greater labour mobility (Wa Kabwe Segatti, 2011). The trend is compounded by progressive labour legislation and higher official wages. The situation was confirmed in interviews with researchers working in the area.⁷

The reported influx of migrant labour, especially to De Doorns in the Hex Valley, further exacerbated the situation. The town has become what can be described as the labour reservoir of the Western Cape (Soreaso, 2012). Growing tensions reached a breaking point in 2008, when thousands of migrant residents in De Doorns were violently displaced (Misago, 2009; Robb, 2009).

The next sections explore the BVM environment for food consumption (i.e. the main types of retailers and consumption patterns) and food production (including infrastructure, land structure and the inflows and outflows of key food products in the BVM).

»»» 3.3 FOOD CONSUMPTION ENVIRONMENT

Supermarkets, the Main Source of Food in Worcester

The rapid urbanization is driven by natural population growth and migration. As a result, there is mounting pressure on the food system to provide for the urban population, which now represents over 60% of the national population according to Stats SA 2020. Urban residents generally rely on purchasing food to ensure their food and nutrition security. Urban agriculture is relatively underdeveloped in South Africa. Worcester is no exception. In 2019, a 24-hour recall survey of 986 households conducted in Worcester, as part of the F4C survey, revealed that self-production accounts for 1.4% of all food items (Davis *et al.*, 2022).

Worcester's food environment has a wide range of retailers: supermarkets, spaza shops (informal shops run from individuals' houses), convenience stores (formal stores with convenient opening hours),

6. Over the 2008–2011 period 1,260 permanent workers and 3,358 seasonal workers lost their jobs. This directly affected around 5,300 and 14,000 individuals (SATI 2011).

7. Interview, researcher at Univ. Cape Town, April 2023

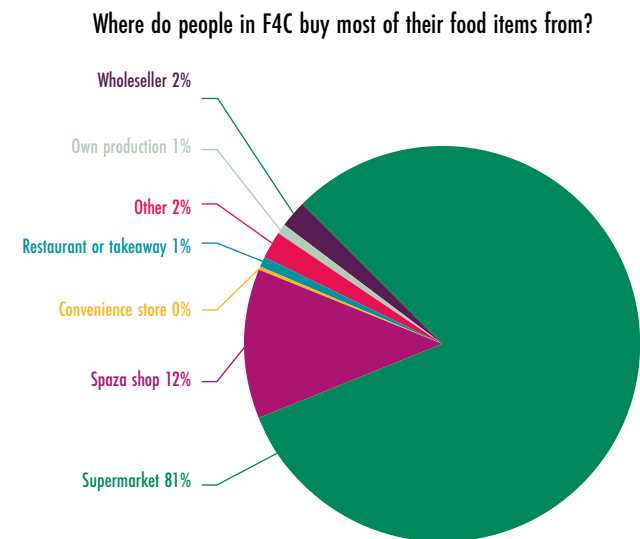
restaurants or takeaways, wholesalers, other (e.g., butcher, soup kitchen, bakkie trader, etc.). Davis *et al.* (2022) classified retailers into two categories: the formal category includes supermarkets, convenience stores, specialty food shops, e.g. bakeries, biltong stores and formal butcheries; the informal category includes spaza shops, *bakkie* traders (traders with pickup vans), roadside stalls and households that sell food to neighbours.

Supermarkets are the main source of food for Worcester residents, representing 81% of food purchases, according to the F4C dataset. Spaza shops are in second place, accounting for 12% of food sources, although they are significantly smaller than supermarkets (Figure 4). This is consistent with findings by Davis *et al.* (2022), who reported that an average of only 14% of all food items consumed in the last 24 hours were purchased from informal sources. The F4C survey also indicates that although most food is bought in supermarkets, a significant amount of certain items is bought from spaza shops: 43% of commercial bread comes from spaza shops vs. 55% from supermarkets; 40% of soft drinks vs. 56% from supermarkets; and 17% vegetables vs. 72% from supermarkets. Davis *et al.* (2022) emphasize that products, such as condensed and powdered milk, and instant noodles are more often purchased from spaza shops or street vendors than from supermarkets. Essentials, such as bread and milk, as well as fruit and vegetables, are often bought from informal outlets.

Further research has shown that as supermarkets expand into low-income neighbourhoods, they tend to overshadow small local businesses. This discourages investment in home food production. Instead, it encourages people in these communities to buy low-cost, nutrient-poor food items (Igumbor *et al.*, 2012; Pereira *et al.*, 2014). It is important to note that spaza shops in informal settlements tend to offer a limited selection of predominantly unhealthy foods. According to a dietitian, “Many spaza shops in informal settlements stock foods high in fat, salt, and sugar, with a significant lack of micronutrients.”⁸ Research by Davis *et al.* (2022) corroborates this, revealing that foods from spaza shops are frequently ultra-processed. Roos *et al.* (2013) found that in Avian Park, processed foods and staples tend to be more expensive in spaza shops than in supermarkets, while fruit and vegetables are usually cheaper. However, the variety of fruit and vegetables in spaza shops is limited due to the lack of storage space and transport for fresh produce.

The spatial distribution of retailers varies across Worcester. Informal retailers, such as spaza shops, are

Figure 4: Different sources of food items consumed in Worcester



Source: Adapted from the 2019 F4C dataset

predominantly found in informal settlements. Davis *et al.* (2022) found that in a low-income neighbourhood, like Avian Park, all retailers are street-based and work in the informal sector. In contrast, other Worcester neighbourhoods have a mix of both informal and formal retailers. For example, the largest formal retailer in Parkersdam, Food World, is surrounded by informal vendors. Interviewees emphasized that spaza shops have a crucial role for residents in informal settlements due to their proximity. Consequently, people in poorer neighbourhoods (e.g. Avian Park or Zwelethemba) are more dependent on spaza shops and street vendors than residents in wealthier areas, like Worcester Central (Davis *et al.*, 2022).

This finding is consistent with our interviews and a study by Battersby and Watson (2019), observing that while supermarkets are increasingly prevalent in low-income areas, their accessibility is often limited by distance. An interview with a health specialist in Stofland, an informal settlement in De Doorns, revealed that food at spaza shops may not always be cheaper than in supermarkets.⁹ For instance, although Shoprite in Worcester offers lower prices, the taxi fare adds to the overall cost of groceries for Stofland residents. However, spaza shops sell food in smaller quantities, which can be an advantage. Residents sometimes shop in the industrial or commercial areas where they work, for the sake of convenience. An official representative from BVM explained that most people who depend on “house shops” for their daily

8. Interview in BVM, April 2023.

9. Interview in BVM, April 2023.

essentials, such as bread, milk and non-perishables, like canned goods and snacks,¹⁰ receive social grants and do not work or travel outside their residential area. House shops are often run by migrants from countries like Ethiopia. By buying in bulk and distributing food among several house shops, they can sell goods at lower prices. This strategy allows them to undercut the prices of single-shop owners.

The most vulnerable populations largely depend on informal food aid. Davis *et al.* (2022) highlighted the critical role of **community kitchens**, which are organized in different neighbourhoods to help the city's poorest. Household and community **food gardens** aim to provide a significant source of nutrition for vulnerable individuals. Nonetheless, they face numerous obstacles and are limited (see Section 5.3). An interviewee from the food and nutritional security field, familiar with informal settlements, explained that "*in the shacks, people may have like door-size gardens*", where they usually grow *morogo* (*Amaranthus hybridus*), a nutrient-rich leafy vegetable not available in shops.¹¹ Growing other nutritional staples, such as vitamin A-rich vegetables, is limited by lack of space. Rearing backyard poultry is uncommon due to concerns about safety and theft. Lastly, **ECD** Centres seem to play a crucial role in providing nutritious food for children. However, they often operate under challenging conditions, including irregular attendance and the parents' inability to pay fees regularly (especially seasonal farm workers). Not all ECD Centres can set up food gardens to grow their own produce instead of buying in food (EDP *et al.*, 2022).

The F4C data also shows that residents in Worcester buy most of their food in the city and only a few items are sourced externally. The food category, 'other meat' (canned or otherwise), is procured entirely from outside sources (100%). Similarly, 'Vetkoek', a fried dough, is generally purchased outside Worcester (56.04%). **This indicates that Worcester's food supply adequately meets the needs of its population.**

High Oil and Sugar Intake, But Different Dietary Patterns Between Population Groups

This subsection presents an overview of food consumption patterns in Worcester, based on the F4C dataset. First, it specifies the most popular items consumed by the general population and by

racial groups. Then, it examines the dietary patterns observed in the region.

Data shows that the most common food items consumed in the households surveyed in Worcester include coffee or tea, sugar, oils and cereals, such as rice and commercial bread (Figure 5). Davis *et al.* (2022) also reported that 82% of respondents had eaten foods high in fats and sugars in the previous 24 hours. Levels of consumption were lower in poorer neighbourhoods, but higher among those receiving food assistance. One interviewee described their eating patterns, which supported these findings: breakfast usually comprises coffee with sugar (but no dairy); lunch often consists of bread or *vetkoek*¹² with processed meats, like *polony* or *viennas* (which are popular in South Africa); and dinner typically includes rice and meat or chicken with potatoes and a few vegetables, like carrots or sweet potatoes.¹³

In addition, there are clearly racial differences in food consumption patterns. The F4C data shows that for a sample of 986 households, the Coloured population represents the largest group (56%) and the Black African population is the second largest group (26%). All population groups drink coffee or tea, while maize consumption is only significant in the Black African population (49%) (Figure 6). Indeed, interviews highlight that Black communities frequently eat mealie meal in the form of «pap», served with sauces made from tomatoes, onions and spinach, which provide most of the nutritional value. Oils and soft drinks are consumed at similar rates by the Coloured and Black African population groups (approximately 55% and 40%, respectively) (Figure 6). The consumption of chicken and milk as protein sources is higher in the Coloured population than in the Black African group. It is interesting to note that dark green leafy vegetables, red meat, fresh fish and ultra-processed dairy products only appear in the top 10 most consumed food items for the Indian or Asian population group, which represents less than 1% of the sampled households.

Fruit and vegetables are consumed by 63% of respondents, but Davis *et al.* (2022) observed lower consumption in poorer neighbourhoods. Interviews also reveal that poor households cannot afford a diverse range of fresh food. They often consume potatoes, onions, tomatoes, cabbage and carrots, typically limiting fruit consumption to apples and bananas. One interviewee stated that vegetables, such as lettuce, zucchini or broccoli are virtually

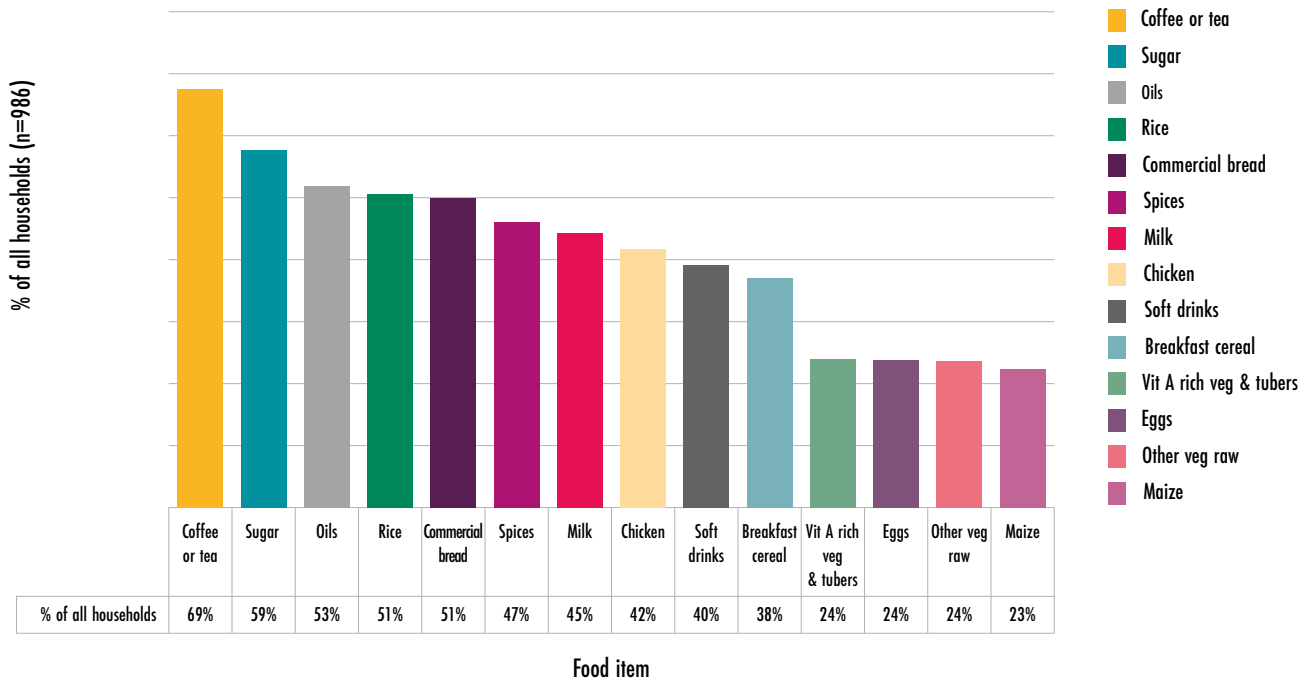
10. Interview, BVM officials, Worcester, April 2023.

11. Interview in BVM, April 2023.

12. Literally 'fat cake'.

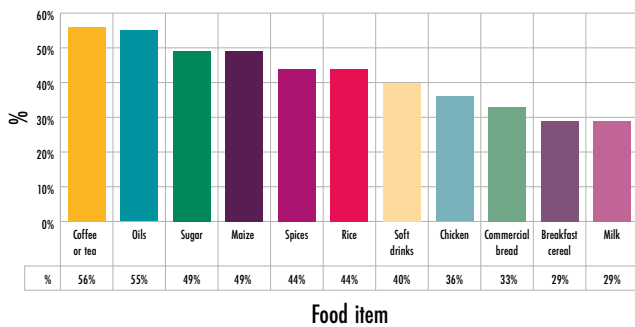
13. Interview in BVM, April 2023.

Figure 5: Proportion of top most consumed food items (n=986)



Source: Author's calculations using 2019 F4C dataset.

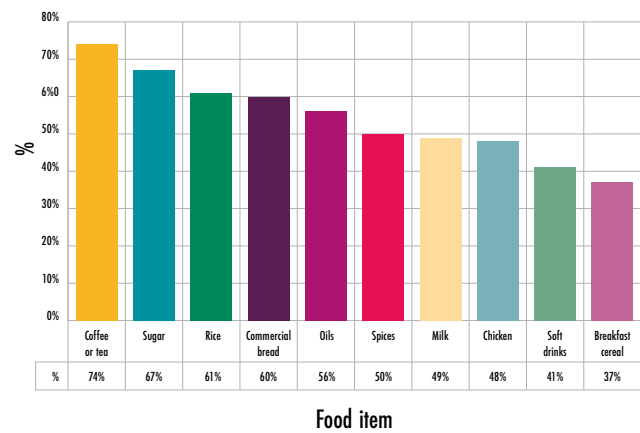
Figure 6: Top 11 food items most consumed by Black African population group (n=259) in Worcester



Source: Author's calculations using 2019 F4C dataset. The figure shows 11 items because consumption levels are the same for breakfast cereal and milk.

inaccessible for poor households.¹⁴ However, traditional African dishes, such as *Morogo* (a spinach-like herb) and *potjiekos* remain popular in poorer communities. Pumpkin is a local staple, especially in informal areas and townships. Its preparation varies across cultures. In Black communities, it is often mashed, while Coloured communities prefer fritters. Pumpkin is also a common ingredient in local soup kitchens. According to one interviewee, although pumpkins and spinach are affordable, they are often prepared with

Figure 7: Top 10 food items most consumed by Coloured population group (n=550) in Worcester



Source: Author's calculations using 2019 F4C dataset.

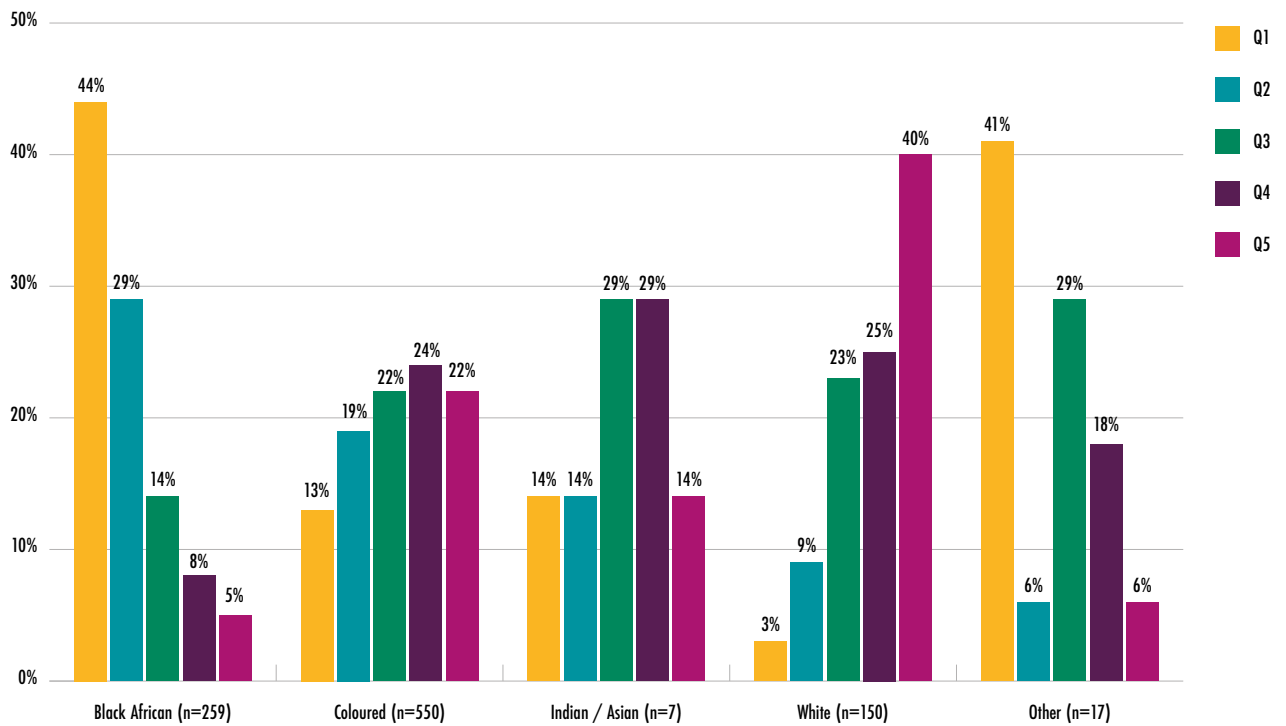
excessive amounts of margarine and sugar or they are deep fried, which is not always healthy.¹⁵

Regarding the consumption of animal-source foods, 84% of respondents reported eating them in the previous 24 hours (Davis *et al.*, 2022). The F4C dataset analysis reveals that chicken and eggs are the most common animal-source foods eaten in recent meals, by 42% and 24% of participants, respectively. In Parkersdam, in central Worcester, a district with

14. Interview, Researcher, Cape Town, April 2023.

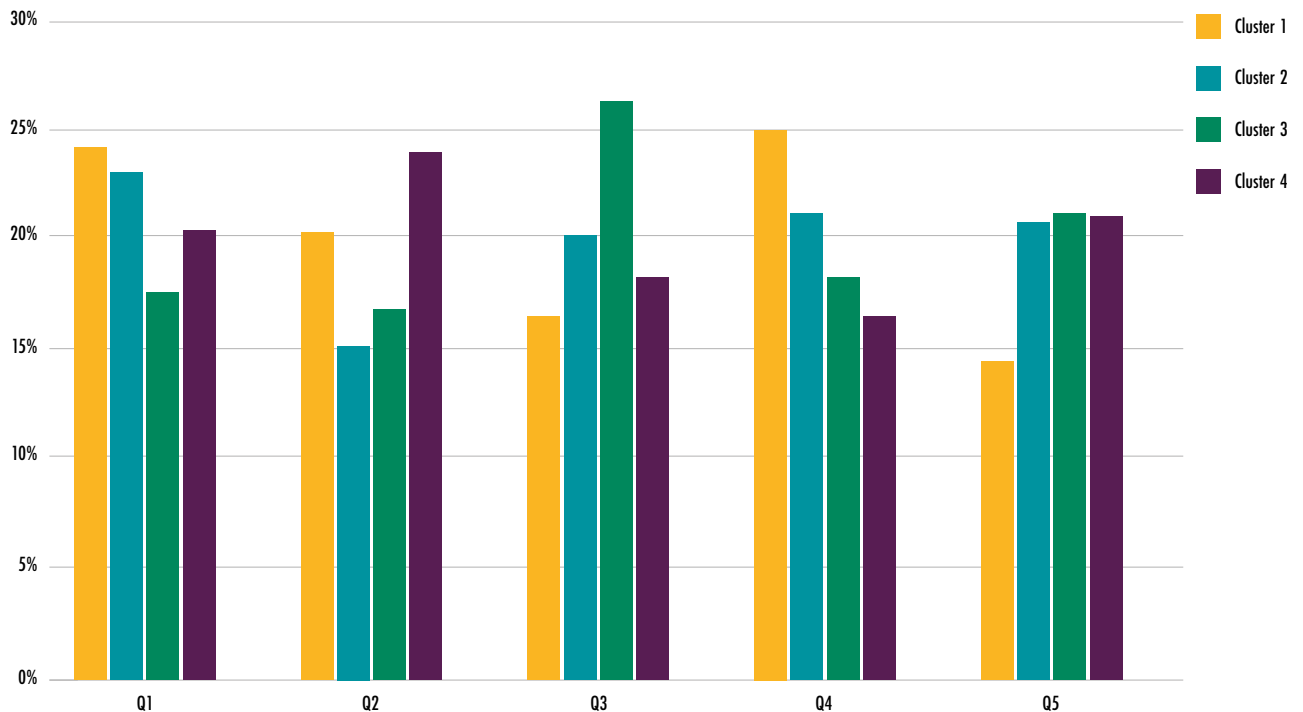
15. Interview in BVM, April 2023.

Figure 8: Wealth Index by population groups (n=983)



Source: Author's calculations using 2019 F4C dataset.

Figure 9: A cluster bar graph showing the distributions of dietary patterns (n=4) by Wealth Index quintiles (Q1 – Q5) (n = 663)



Source: Author's calculations using 2019 F4C dataset.

diverse retailers, where many households rely on grants, meat and fish are considered “luxury goods”. Retailers note that shopping peaks on grant payout days or at the end of the month (EDP *et al.*, 2022).

Furthermore, using cluster analysis on the F4C dataset, we identified four main dietary patterns based on 24-hour dietary recall data.¹⁶ These patterns reveal commonalities, such as high consumption of coffee or tea across all clusters, as well as differences, notably in

the consumption of oils/fats and chicken. The clusters represent distinct dietary habits, including:

- **Cluster 1** (n=104, i.e. 15.69% of households) features a diet rich in protein from white meat and vitamin A-rich vegetables and tubers, with a significantly higher intake of fresh chicken compared to other clusters. This group also consumes a wide variety of food items (as five food items are consumed by more than 80% of individuals), with an average of 14.32 items consumed per person, which indicates a diverse diet.

- **Cluster 2** (n=251, i.e. 37.86% of households) has a low protein consumption of red meat, but an equal distribution of other food items. On average household members consume 11.83 items. Members in this cluster have a relatively balanced diet.

- **Cluster 3** (n=137, i.e. 20.66% of households) is characterized by high consumption of oils or fats and dairy products. Red meat intake is significant, but consumption of vitamin A-rich vegetables, chicken and eggs is low. The average number of items consumed is 10.23 per individual.

- **Cluster 4** (n=171, i.e. 25.79% of households) primarily consumes cereals, with minimal oil intake and fewer options in vitamin A-rich vegetables and eggs. This cluster consumes the lowest number of items on average, 7.27.

A Wealth Index (WI) was created using data on household durable assets as a proxy for living standards. Figure 8 shows the quintiles (20% of population) across the different population groups: quintile 1 (Q1), representing the poorest share of the population, is comprised of a majority of households from the Black African group. Similarly, Q2, has a majority of households from the Black African group. In contrast, the White population is overly represented in Q5 (40%), the wealthiest quintile and only 3% of White households are in Q1. We observed that the third cluster, characterized by high consumption of red meat, is most popular in the middle to upper quintiles (Q3 and Q5). Although the analysis is not conclusive, this may indicate a possible correlation with greater wealth. Clusters 2 and 4 appear to be more evenly distributed across all quintiles (Figure 9).

Supermarkets play a crucial role in Worcester's food environment. Nonetheless, informal food sources also have an important role in vulnerable neighbourhoods. Informal retail food is often less healthy, more

expensive and less diverse than supermarket food. Yet, factors like proximity and the possibility of buying small quantities heavily influence consumer choices. The following section investigates which food products are available within the BVM area or brought into Worcester from outside.

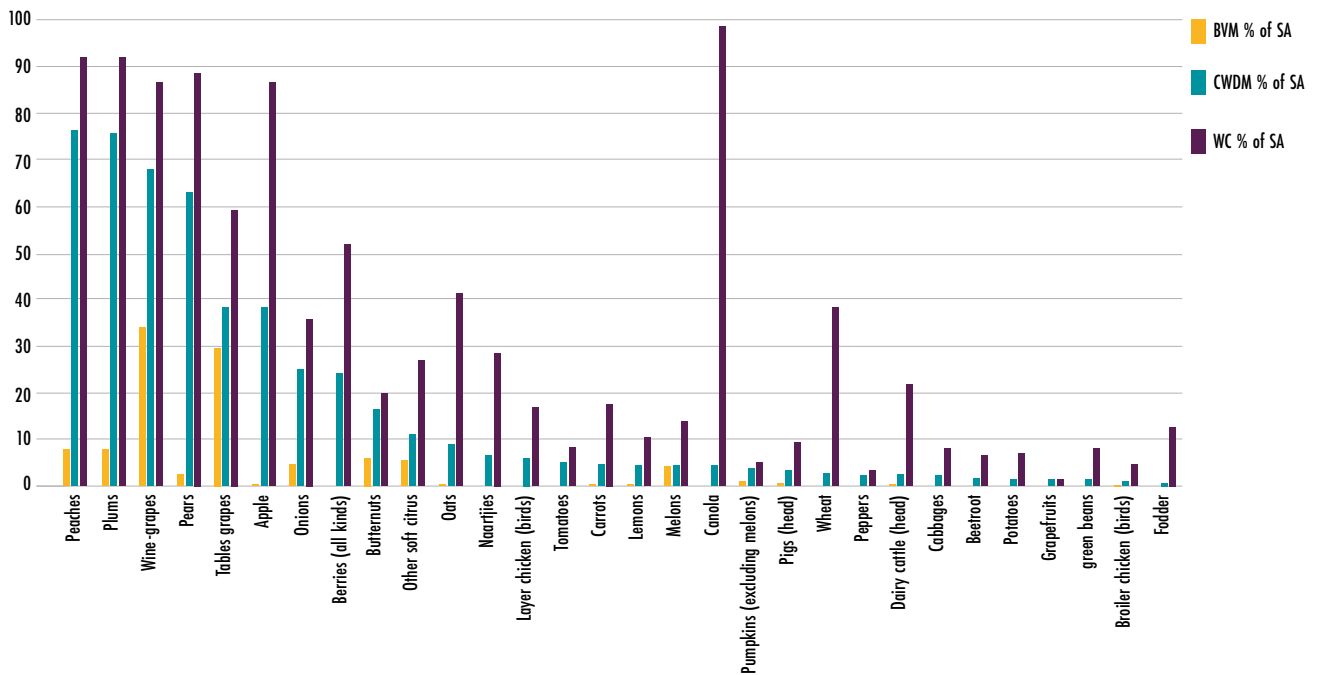
>>> 3.4 FOOD PRODUCTION ENVIRONMENT

The Cape Winelands District (CWD), of which the BVM is part, is distinguished by its rich agricultural production environment. Its robust agricultural **infrastructure** is well integrated into national and global value chains. Indeed, its production surpasses that of other districts in the region. According to the Western Cape Agricultural Sector Profile 2021, the district boasts the highest number of battery chicken units, homesteads, nurseries, pig farms and agricultural pipelines in the Western Cape. With its extensive infrastructure and diverse agricultural activities, the district has the capacity to manage and scale agricultural production efficiently. The CWD is also well equipped in terms of its processing infrastructure. It has excellent facilities, such as packhouses, distilleries, fruit packers and cool chain systems. This infrastructure is crucial for adding value and boosts the economic importance of the district's agricultural sector (WCDoA, 2022).

The CWD is a **major fruit producing** region, as shown in Figure 10 and discussed in Section 4. For example, table grape production in BVM accounts for half of all table grapes produced in the Western Cape Province, totalling 193,888 metric tons. Grade A table grapes are reserved for export, while grades B and C are primarily destined for the domestic market. BVM produces 34% of the country's wine grapes, as well as a variety of other fruit, including stone fruit, melons, pears, apples and lemons. This information was confirmed during the Learning Journeys, when the significant local production of vegetables, broiler chickens, layers and pigs was also highlighted (Overy, 2022). In commercial agriculture, BVM contributes 7.7% to the national output of **pumpkins and butternut squash**. Animal production in BVM is renowned for broiler chicken and pig farming. The broader CWD area provides support for laying hens, sheep, goats and beef cattle (Stats SA, 2020a).

16. The method adopted was agglomerative hierarchical clustering (AHC), a bottom-up approach. In AHC, each instance is considered as a cluster. The clusters are then merged to create larger clusters (Fernández and Gómez, 2008). This continues until all the clusters are merged into one large cluster, which contains all the instances. The Euclidean distance was used to measure the similarity in terms of individual dietary patterns. The algorithm used was Ward's minimum variance. The analysis was conducted on a sample of n=986 individuals and n=663 observations (67.24% of the sample) were clustered. The final analysis only included 18 of the 49 food groups, organized into four clusters, in order to limit data dispersal. A dendrogram was constructed to truncate and display the four clusters. This facilitated data interpretation and classification.

Figure 10: Proportion of national production from Breede Valley Municipality, Cape Winelands District and Western Cape Province (30 top food items in CWD, each representing more than 1% of national production)



Source: Census of commercial agriculture, 2017

Despite substantial local production, Learning Journeys in Parkersdam revealed that retailers still import broiler chickens from different countries (see Section 4). Conversely, most fruit and vegetables in Worcester are sourced locally. However, imports of out-of-season table grapes from Spain, soft-peel citrus from Morocco and tropical fruit from Brazil have been reported in a national greengrocer chain. Vitamin A-rich vegetables and tubers, such as pumpkins, carrots and butternut squash—which rank as the 10th most consumed food group in the F4C survey—are grown abundantly in BVM. Yet, informal vendors often obtain their produce from wholesalers, who may in turn buy produce from outside the BVM region or import it from other countries (EDP *et al.*, 2022).

The steady population growth exacerbates the **pressure on land and water**. In addition to the issue of land structure and occupation, this poses a significant challenge for food production within the food system. Over half of the Western Cape’s orchards are located in the CWD, representing 57% of the orchards in the province. Although there is some demand for full-time commercial farming, land is generally needed for part-time and small-scale production destined for household consumption and local markets. The demand for land among young people is considerable, given that few expect to find regular employment on farms or in towns (WCDoA, 2022). This situation reflects broader national challenges regarding inadequate land policies. The first democratically elected

government aimed to redistribute 30% of the 77 million hectares of agricultural land by 2000. By 2012, the NDP aimed to meet this target by 2030. According to Sihlobo and Kirsten (2021), around 13.2 million hectares (17%) have been transferred from White landowners to the state. Various mechanisms are used, such as restitution, redistribution, private deals and state purchases. An additional 2.3 million hectares of land has been transferred to communities. Overall, this corresponds to a total of 20% of land formerly owned by Whites. In the BVM, private transactions, including leasing, are more prevalent than state-led redistribution or land restoration efforts.

The concentration of primary agriculture and its value chains, alongside efforts to promote inclusive business models, shifted the focus from initial policy objectives, mirroring challenges in water policy reform where, despite 25 years since the Act’s passage, water allocation remains heavily biased (75% to white farmers). The Department of Water Affairs has tried to rectify the situation, by implementing redistribution strategies and draft regulations for equitable resource sharing. However, these attempts have been met with resistance and modifications, highlighting ongoing struggles to achieve fair resource distribution.

Lastly, commercial farmers in the CWD, and especially in the BVM, who want to export their produce are up against significant **logistical challenges**. This is largely due to the inefficiency of the Port of Cape Town.¹⁷

17. Interview, commercial farmers’ representative, BVM May 2023.

The bottlenecks involved in the export of agricultural produce cause delays and increase costs. This not only hits large-scale, export-oriented farmers, but also the local economy and job market. Similarly, smallholder farmers are impacted by limited access to local markets and essential inputs due to poor road conditions and inadequate transport facilities.

This situation increases costs and reduces market competitiveness.¹⁸ Poor infrastructure in informal settlements means that residents have limited access to reliable transport services. This makes it more difficult for them to access affordable food, thus, creating a vicious circle, with higher prices and less available fresh produce (see Section 5).



18. Interview, Department of Agriculture, Online April 2023.



4

The BVM Food System's Unequal Structure

Drawing on fieldwork conducted in 2023 and secondary data, this section examines three value chains, which are key to understanding the structure and dynamics of the BVM food system: the table grape global value chain (GVC), the domestic chicken and pumpkin value chains (VC). We explore the structure, actors and governance of each one. We also highlight their interactions and integration within other crucial regional VCs, including grain, meat and vegetables.

>>> 4.1 THE TABLE GRAPE GVC: THE BACKBONE OF BVM'S FOOD SYSTEM

General Structure and Activities

South Africa is the 3rd largest producer of table grapes in the Southern hemisphere and the 5th largest exporter globally.¹⁹ The table grape is central to South Africa's agricultural industry, making a major contribution to foreign exchange earnings and job creation. Between 2006/07 and 2014/15, the sector's gross value added increased from R2 billion to R4.9 billion, a 145% growth

across nine seasons. This upward trend persisted, reaching R9.1 billion in 2017/18 (DALRRD, 2020). The industry is **labour-intensive** and over 101,000 workers were employed during the 2022/2023 season. This includes around 14,800 permanent staff and approximately 86,800 seasonal workers. There are 316 growers operating more than 530 units, which demonstrates a relative concentration of capital and risk factors. The BVM is central to the table grape industry, as outlined in Section 3.4. The Hex River Valley (Figure 11), a key area in the region, has been cultivating table grapes for over a century and boasts the country's longest harvesting period, from January to May. The region produces over 21 million cartons annually (4.5 kg equivalent) and employs around 17,700 workers, which makes it a major production hub (SATI, 2023).

Until the late 1990s, the South African fruit industry, including table grapes, was regulated by a single marketing channel for most commodities. This meant that the supply chain was relatively simple and easy to manage in terms of optimization and balancing supply and demand in the sector. Following national deregulation and a shift to a free market system in

Figure 11: Map of the Hex River Valley (outlined in pale blue) in the Breede Valley Municipality (outlined in yellow)



Source: Google Earth, 2024.

19. Post-Harvest Innovation Programme webpage: <https://postharvestinnovation.org.za/commodities/table-grapes/> (retrieved April 3 2024)

1997, the table grape GVC benefited significantly from new export opportunities, particularly to the EU and the UK. There was a considerable increase in exports (Trienekens & Willems, 2007). In the early 2010s, the industry had to deal with increasing commercial challenges in a demand-driven market. These included intense competition due to global fruit oversupply and emerging competitors, primarily from Latin America. The changes generated unique vulnerabilities in the supply chain, mainly due to the produce's limited shelf life. The quality and availability of raw materials varied, which was also problematic. This combination of factors posed a threat to individual actors and to the VC's overall equilibrium (Stone & Rahimifard, 2018).

The BVM's table grape VC is mainly export oriented, much like the typical South African table grape VC (see Figure 12). The BVM table grape VC involves extensive regional flows of food, information and money. Various resources, such as packaging and cold storage facilities are shared, alongside service agreements for transportation and shipping (Vermeulen *et al.*, 2013). It is interesting to note that most export chain losses occur domestically, particularly at the production and intake stages, with up to 9.5% of losses and waste reported in these areas. The GVC is made up of diverse configurations of actors, who are linked to the various activities (Louw, 2017; Trienekens & Willems, 2007).

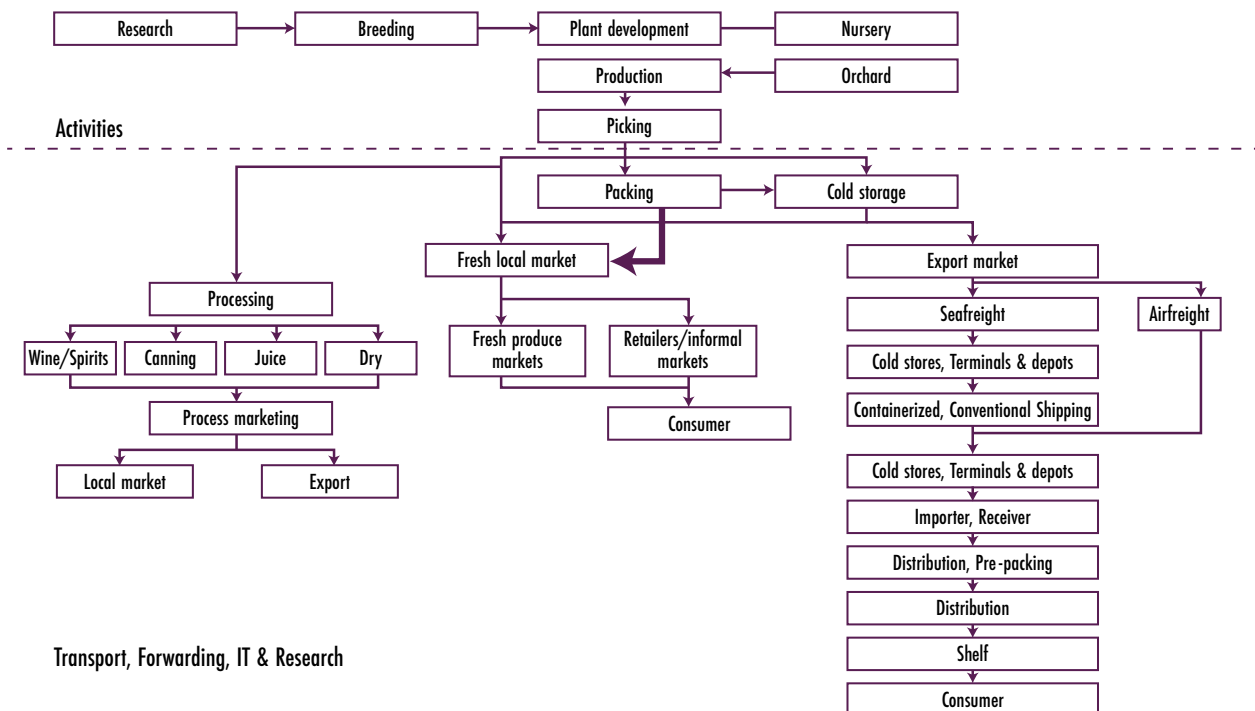
The core activities within the BVM table grape VC can be categorized into three main groups presented below:

From Farm to Packhouse and Cold Storage

Table grapes and other agricultural products are regulated by different legislation, such as the Agricultural Product Standard Act (1990) and the Marketing of Agricultural Products Act (1996). These set production, marketing and safety standards. The Perishable Product Export Control Board (PPECB), established in 1983, ensures that products meet quality standards in terms of cold chain and shipping management. The regulatory framework also involves the National Department of Agriculture, which is responsible for phytosanitary certification. This is crucial for meeting international demands for better food safety and high-quality produce.

The Industry's Expansion: The Hex River valley's table grape industry has expanded significantly since export markets opened. The area cultivated increased from 4,577 hectares in 1997 to around 6,300 hectares by 2023. The number of grape growers tripled from 102 to some 300 between the 2013/2014 and 2022/2023 seasons (SATI, 2013, 2023). Most table grape farms are modern businesses, which use high-quality input materials and production methods. They rely on a dynamic network of suppliers to provide goods and services promptly, including: production materials; plant development and breeding services; vineyard protection nets; fertilizers and pesticides; packing and cooling materials, like cartons, caps, and gloves; transport services. Interviewees stated that they rely on European or US suppliers of genetic material for

Figure 12: Typical SA table grape supply chain



Source: Optimal Agricultural Business Systems (OABS) (DARLLD 2020).

specific vine varieties. For example, Crimson Seedless is now prevalent in Hex River because it meets the changing preferences of export markets.²⁰ This reliance may lead to a dependence on foreign companies for both innovation and market access.²¹

Industry Consolidation and Production Efficiency:

Since the 2010s, the intense competition has led to a decrease in the number of producers in the Hex River region and nationally, giving way to more efficient production in larger or multiple units. **This shift signifies a consolidation process among table grape growers that is underway.** Smaller-scale growers, struggling to compete in the demanding commercial environment, often downsize or exit the market. Many have high debt ratios, which limits their capacity to invest in vineyard renewals and high-value varieties.²² As a result of consolidation, producers can meet the high-volume demand of retail buying programmes and secure stronger downstream linkages in the VC (Barrientos & Visser, 2013). For this purpose, growers often cooperate and establish links with other actors in the GVC. For example, growers develop sales strategies to structure their activities and improve logistical planning in the chain; they invest collectively in cold stores; develop joint marketing strategies; set up producer-exporter agencies. In addition, many farms have developed their own packing facility. For instance, Cordia Plaas is a table grape farm and packhouse. The business ASV Farms opened a packhouse to provide a central packing facility for the grapes harvested on the 9 ASV farm facilities in the Hex River Valley and surrounding area.²³

To access international markets, most producers and exporters have to comply with social and environmental standards. Private sector associations (e.g. Growers by Nature) in the BVM have integrated social and environmental concerns into their initiatives. Various opinions were expressed about adherence to industry standards, but there is limited available information regarding their concrete outcomes (see Section 5).

Labour Challenges and Working Conditions: Despite the growth in production in the sector, working conditions have deteriorated, with the eviction of farm workers, casualization and exploitation in De Doorns and Rawsonville (Devereux, 2020) (see Section 5.1). In addition, labour brokering significantly shapes

seasonal employment in the BVM table grape industry, exacerbating regional conflicts. Social unrest over labour conditions, including issues related to brokering, led to significant changes in employment practices following the events in De Doorns in 2008/2009 and 2012/2013 (J. Theron, 2008; J. Theron & Visser, 2012).

From Packhouse-Cold Storage to Importer

Cold Storage Facilities: After the harvest, grapes are packed and stored in cold storage facilities, which are owned by individual farmers or cooperatives. Cold storage operators are responsible for receiving, handling and cooling the table grapes to the required temperature. They ensure that the correct fruit is loaded into a truck or container approved or registered by the PPECB (DALRRD, 2020). Export South Africa (EXSA), established in 1997, is a large table grape cold storage and export company operating in Hex River and Robertson.²⁴ Another initiative is the HexKoel cold storage facility in Orchard, de Doorns, with 170 shareholders. Originally established in the early 1980s as a cooperative, this operation has grown significantly over time. Today, it is owned and managed by table grape growers and is one of the largest facilities of its kind internationally.²⁵ It is important to note that the increasing instability and cost of electric power, caused by frequent load shedding, are now a major concern for these companies (see Section 5.2).

Exporters: Exporters must coordinate various actors in the logistics chain, including cold stores, transporters, shipping lines, port terminals, clearing and forwarding agents, PPECB, regional producers' associations and market inspectors. Exporters are also responsible for managing the cold chain and correct fruit handling to ensure that the quality of fruit is maintained until it reaches its destination market (DALRRD, 2020). Exporters strive to develop long-term relationships with producers, by offering credit, investing in cold storage facilities, and working with other exporters on public relations and marketing initiatives (Trienekens & Willems, 2007). For instance, 'Growers by Nature' is a marketing and export company operating in the Hex Valley; 'Grape Alliance Marketing' is located in de Doorns and provides a grower-based export vehicle for producers, who want to be directly involved in the marketing and export of their own fruit.²⁶

20. Interview, communication professional and grower in BVM, April 2023.

21. Interview, cold store manager in BVM, April 2023.

22. Interview, table grape grower and representative, April 2023.

23. ASV Farms, 2023: <https://asvfarms.co.za/>, retrieved November 22 2022

24. EXSA web page: <https://exsa.com/> retrieved Dec 15 2023.

25. Hexkoel: <https://www.swirlandspice.wine/2021/03/01/hexkoel-hex-river-valley/>, retrieved Dec 15 2023.

26. Grape Alliance web page: <https://www.grapealliancemarketing.co.za/portal/home.xhtml>, retrieved Dec 15 2023.

The number of exporters in South Africa surged to over 386 by 2003 but dropped to 76 by 2023. This clearly reflects the concentration of the table grape sector (FPEF, 2003, 2023). The Fresh Produce Exporters' Forum (FPEF), established in 1998 as a non-profit, is the main fruit export organization in South Africa. With 70 members handling 85% of the export volume, FPEF operates on voluntary membership. It serves as the international gateway for South Africa's high-quality produce and provides leadership and services to its members and global buyers (DALRRD, 2020; Trienekens & Willems, 2007).

Transport Companies/Haulers: Transport companies have an essential role in the fresh fruit supply chain. They ensure the seamless movement of products between producers, cold storage facilities and terminal operators. Their task is to preserve the cold chain during transit (DALRRD 2020). Modern transport companies have refrigerated trucks to convey grapes for export to ports in Cape Town and Durban (Louw, 2017). Many exporters hire contractors to organize transport and harbour storage. Contracts are often short-term. Transport companies also manage logistics between different supply chain stages, which encourages a more comprehensive approach to problem solving along the VC (Trienekens & Willems, 2007).

Terminal operators: Terminal operators must notify exporters, PPECB, transporters, producer associations, producers and cold store operators about port-related delays. These include labour strikes, poor weather conditions, congestion and other traffic issues that may affect the flow of fresh produce in and out of the harbour. The South African Port Operations (SAPO) container terminal communicates with shipping lines. Several Hex River exporters reported tensions with SAPO in Cape Town harbour,²⁷ but an additional crane in 2022 was expected to speed up operations. The crane was intended to enable three vessels to be loaded simultaneously, a significant improvement compared to previous seasons. However, the grape industry has faced considerable delays and logistical problems in the last two seasons and has yet to see the benefits of this addition.²⁸

From Importer to Retailer

South Africa exports over two-thirds of its table grapes, with Europe as the primary market.²⁹ The Netherlands is Europe's main entry point for South African grapes,

accounting for 40% of total exports, followed by the United Kingdom (24%) and Germany (5%). The export market to Asia (8%), the Middle East (5%) and the rest of Africa (4%) has strong growth potential, which South Africa is keen to develop. However, it is important to note that after reaching the European market through the Netherlands, more than 76% of these exports to the Netherlands are transported to Germany, making it the largest single-country export market. The USA and Canada are emerging markets, accounting for a growing percentage of exports (USDA & GAIN, 2020).

Although most grapes are exported, **10% of total production is absorbed by the domestic market** (DALRRD 2020)³⁰. Table grapes that fail to meet export requirements are diverted to the domestic market for fresh consumption or processing. However, they are considered to be a luxury item and supply exceeds local demand (NAMC, 2014; Vermeulen *et al.*, 2013). Yet, domestic demand is rising with the growing number of middle-income consumers. So far, exports to Africa are low, but there is potential for growth given the continent's economic expansion (Alford *et al.*, 2021).

The trend shows that South Africa's share of the export market is declining in the face of growing international competition. Export volumes from Chile, the largest competitor in the Southern hemisphere, have been stable since 2006, while Peru has recently surpassed South Africa's exports (ACDI & SmartAgri, 2015). SATI initiated a campaign to meet Chinese specifications in order to expand its exports to this. This was supported by a market development plan managed by SATI, with funding from the Western Cape Department of Agriculture (WCDoA). In 2016, SATI and DALRRD successfully lobbied China, calling for the deregulation of Chinese cold treatment protocols. The changes have facilitated South African exports to China (Kriel, 2020). Lobbying for similar regulatory adjustments to facilitate access to the United States market is also a possibility (USDA & GAIN, 2020). Relationships between South African exporters and the EU and UK markets vary. Some large buyers offer credit. Supermarkets drive changes in the global agro-food trade. They apply strict standards, with a focus on cost, consistency and consumer demand, which can affect farmers' pricing power.

27. Interview, table grape representative, BVM April 2023.

28. Fresh Plaza, 2023: <https://www.freshplaza.com/europe/article/9463720/south-african-grape-grower-upbeat-ahead-of-fruit-attraction-madrid/>, retrieved Nov. 11 2023.

29. South Africa benefits from a shorter shipping distance than other competitors in the Southern hemisphere, as well as a high demand for seedless varieties and a free trade agreement with the EU.

30. Food and Agriculture Organization webpage: <https://www.fao.org/faostat/en/#data/FBS>, retrieved March 3 2024.

>>> 4.2 THE CHICKEN AND PUMPKIN VALUE CHAINS: DIETARY IMPORTANCE FOR LOW-TO-MEDIUM INCOME HOUSEHOLDS

Chicken Broiler: Balancing Domestic Distribution and Exports

South Africa boasts the highest per capita meat consumption on the continent, averaging 60 kg annually (Stats SA, 2020b). National consumption of broiler meat, the most affordable option, comprises 60% of total meat intake (Queenan *et al.*, 2022), surpassing global consumption levels. South Africa is the leading broiler producer in Southern Africa, accounting for 75% of the region's production. Broilers significantly contribute to the country's agricultural output, both in tonnage and economic value. The sector generates a gross value of R48.5 billion and constitutes approximately 15.5% of the total gross value of agricultural products. The Western Cape Province, particularly Worcester, is a major poultry producing area (WCG, 2016).

Despite the industry's growth, **South Africa relies on imports to satisfy local demand**, making it one of the world's least protected markets. Over the past decade, exporters like Brazil, the EU and the US have flooded the market with cheap chicken. However, imports in 2022 totalled 360 252 tonnes, about 30% lower than the 5-year average (2017 to 2021), putting the ratio of domestic production to imported products at 0.16 (SAPA, 2022).

Although self-sufficient in maize, South Africa imports soya to meet the demand for livestock feed, which exceeds local production. Soya imports are primarily destined to feed broilers. The broiler sector's

dependence on maize and soya makes it vulnerable to price fluctuations. Thus, the COVID-19 crisis and later the Ukraine conflict had a significant impact on the sector. In 2022, broiler producer prices were 12.1% higher on average than in 2021. In comparison, feed prices saw an average increase of 16.7% (SAPA, 2022). The South African broiler value chain is characterized by a dualistic structure, where large, integrated market leaders coexist with smaller, disadvantaged producers. Despite the challenges they face, small producers play a crucial role in supporting rural livelihoods and improving food accessibility. They can reach rural and informal markets, which serve some of the most marginalized consumers. In addition, they enhance the resilience of supply chains with regards to uncertainties and possible disruptions, as indicated by Cuevas *et al.* (2021) and Louw *et al.* (2017).

General Structure and Activities

The activities in the broiler VC are categorized into three main areas: 1) Supply activities, ranging from genetic material to the provision of day-old chicks; 2) Broiler farm operations, closely linked with the broiler feed industry; and 3) Abattoirs and distribution, which includes related processes and activities (Figure 13). The BVM broiler VC reflects this dynamic. Its activities are highly integrated, which means it can cater for both domestic and international markets (WCG 2022).

In South Africa, the broiler VC is largely defined by its commercial production and formal retail sectors. The sector has experienced rapid growth, fuelled by significant investments from large firms. Indeed, over 75% of broilers are produced by just seven major commercial producers (SAPA, 2019). Emerging and contract broiler farmers only account for about 2% of South Africa's chicken meat production. This shows that greater market access is needed for new entrants (SAPA 2019). Although South Africa imports more than

Box 2: The Broiler Industry's Institutional Environment

Broiler policies in South Africa focus on production goals to spur the industry's growth and bolster national food security (Queenan *et al.*, 2022). The DALRRD introduced the Agricultural Policy Action Plan in 2016/2017, which targets the poultry value chain, the feed industry, and the maize and soya sectors. It is designed to synchronize government funding with strategic national goals, including processing efforts.

The 2019 Poultry Master Plan involved poultry producers, meat importers, organized labour and the government. It set targets, such as achieving a minimum of 10% production growth in four years. The plan includes a R1.7 billion joint investment from the industry and government to establish 50 new commercial-scale contract farmers to encourage processing and boost industry expansion. This is expected to increase the demand for locally produced poultry feed and will require additional investments in poultry processing facilities. The plan also seeks to improve Black ownership and participation across the value chain and encourage worker share-ownership schemes. The soybean development strategy, as mentioned in the Land Reform and Rural Development's Baseline reports and the Agricultural Policy Action Plan, aims to ensure self-sufficiency in feed supply and greater competitiveness.

In this context, the South African Broiler Association (SAPA) acts as the collective representative for the industry, focusing on information dissemination and addressing collective sectoral issues. SAPA promotes cooperation with various organizations, including the National Agricultural Marketing Council (NAMC), Proudly South African, the National Animal Health Forum (NAHF), as well as other national and international agricultural commodity organizations.

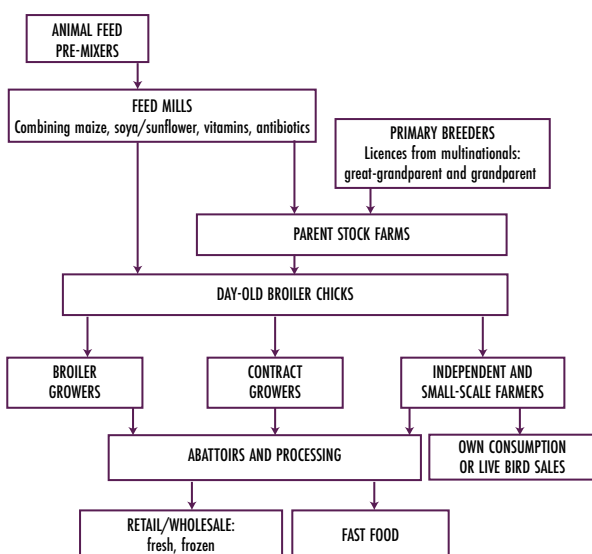
it exports, a share of its production is designated for foreign markets. The City of Cape Town Metropolitan Municipality is the leading exporter, contributing 88% of the national export value. It is followed by the CWD, which produces 11% of the export value, or R 7,831,000 (SAPA 2022). BVM also exports to countries like Botswana (WCG, 2022).

The broiler VC is predominantly managed by **RCL Foods (formerly Rainbow Chicken)**, the largest chicken processor and trader in South Africa. The Rainbow Chicken factory in Worcester accounts for 6% of the country's broiler chicken output. In 2021, RCL Foods employed about 20,500 full-time and 800 part-time workers nationally. Thus, it played a vital role in supporting both formal and informal employment in the BVM area (RCL, 2021).

Parent Stock and Supply of Day-old Chicks

Most genetic materials, primarily Cobb 500 and Ross 308 breeds, are imported at the grandparent level. International breeding companies have only granted distribution rights for the parent stock to three companies in South Africa. These companies provide parent stock to integrated and non-integrated broiler breeder operations. In these units, parent birds are reared until they start laying. The eggs are then transported to hatcheries, where they are incubated and hatched. The day-old chicks are either sold to independent broiler growers or used internally by fully integrated companies. Large integrated producers prevail in the day-old chick production sector, which requires significant capital investment and specialized knowledge.

Figure 13: Diagrammatic representation of a generic broiler supply chain in South Africa



Source: Roberts et al., 2017.

Broiler Farms and Feed Supply

Commercial producers are typically large-scale, business-oriented operators on privately owned farms. They use intensive production systems, characterized by high investment and input levels. They are also deeply integrated into the formal market (Queenan et al., 2022). In 2018, RCL Foods, alongside Astral Foods, accounted for 46% of the national broiler meat production.

The BVM broiler VC mirrors the national industry's dual structure, with: i) a dominant commercial production sector, represented by RCL Foods' **Rainbow Chicken** processing factory. RCL Foods is a fully integrated broiler producer that breeds, rears and feeds its livestock from its own feed mills. It also processes, distributes and markets fresh, frozen, value-added, as well as processed chicken; and ii) a smaller segment of limited emerging broiler farming units.

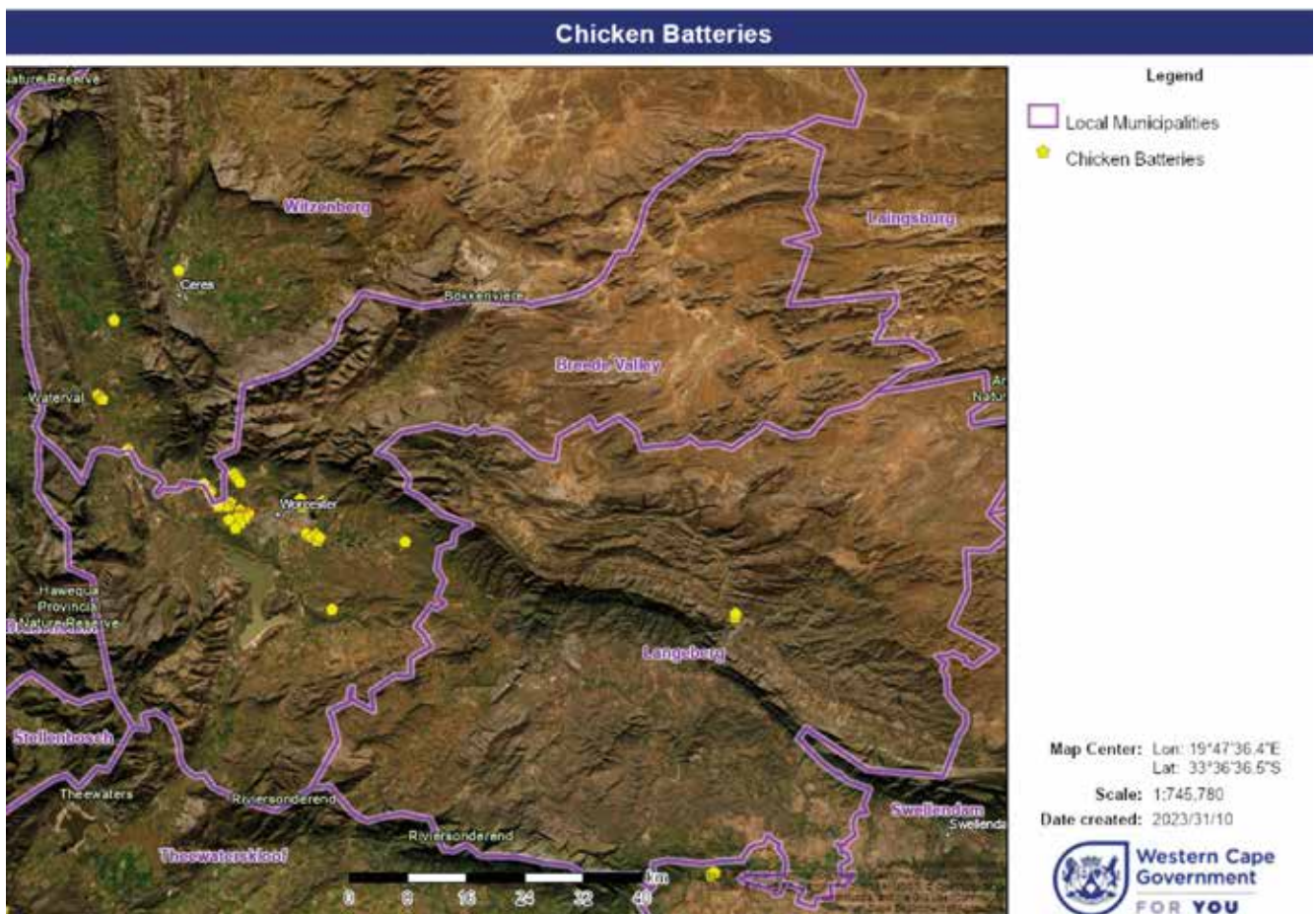
The poultry sector is the primary consumer of animal feed in the country, accounting for 66% of the 7 million tonnes of feed sold in 2022 (SAPA 2022). The animal feed industry is dominated by highly concentrated companies, such as Epol and Meadow. They generally engage in vertical integration with leading commercial producers. In the broiler sector, feed constitutes approximately 70% of total production costs. Broiler meat and feed prices are volatile. Between August 2015 and early 2017, drought conditions hiked up feed prices, which outstripped broiler revenue. However, in 2019, the annual growth in broiler prices (7.5%) exceeded the rise in feed prices (5.5%) for the first time since June 2018 (SAPA 2019). Towards the end of 2022, broiler producer prices increased by 11.4% on average, but these gains failed to compensate for the rising feed costs (SAPA, 2022).

Abattoirs, Processing and Distribution

South Africa's domestic market includes around 265 formal abattoirs. Most commercial broiler meat is sold through these abattoirs to five major retailers (Pick n Pay, Shoprite-Checkers, Spar, Woolworths, and MassMart), as well as to various Small Micro & Medium Enterprises (SMMEs) in the retail sector. The BVM is well endowed with the infrastructure required to support a productive food system, including battery units for broilers and layers, as well as hatcheries (Figure 14) (WCGPT, 2017).

Abattoirs process broiler meat. Carcasses are sold to processors and packers, who then supply the market with fresh, frozen or further processed chicken. Their products are sold to retailers and processors or sold for export. Processors and packers also rely on chicken imports. Retailers distribute the end product to consumers (SAPA 2022). RCL Foods is the country's largest food manufacturer, with 280 operations and 30 brands (RCL 2021). Vector Logistics, RCL Foods'

Figure 14: Chicken batteries mapped during the 2017/18 Western Cape census



Source: Western Cape Department of Agriculture, 2023.

supply chain specialist, contributed R3.2 billion to the company's 2021 revenue. It is South Africa's largest stakeholder in frozen logistics, with 8,720 active vendors in 2021³¹. *Simply Chicken*, a value-added brand of RCL Foods, produces freezer-to-fryer products and chilled processed meats.

Regarding the environmental footprint, the Carbon Disclosure Project (CDP) is a non-profit institution that conducts an annual survey of the world's leading businesses. It considers how they manage the impacts of climate change, water security and forests. RCL Foods has participated in the South African CDP surveys since 2015, maintaining a B rating for Climate Change in 2020 and B- for Water Security (RCL, 2021).

The BVM broiler VC is geared towards both export and domestic markets. But how much local produce is distributed locally and how does it benefit the population? RCL products are sold in Worcester retailers, such as Pick n Pay, which suggests that local production may benefit the local population to

some extent. However, most stores in Parkers Dam neighbourhood stock imported chicken (from the US, Poland and Denmark), rather than RCL products, with the exception of Shoprite's Food World. In addition, RCL's local sales may include by-products like chicken feet and liver, which are often sold through informal markets.³²

Small-scale farmers typically sell through the live broiler market. This market relies on hawkers and small retailers for distribution to end consumers. Most of their sales go through live markets and abattoirs (SAPA 2022). However, they face a range of challenges:

- **High Input Costs and International Competition:** Broiler meat prices have significantly increased, mainly due to rising input costs. From 2011 to 2021, producer prices rose by R9.89, a 72% increase (SAPA 2021). Small-scale broiler farmers often enjoy larger margins than commercial farmers because of their higher sale prices (SAPA 2019).

31. RCL Foods website: https://rclfoods.com/wp-content/uploads/2021/01/RCL_Corporate-Brochure_03.12.2020-edited.pdf, retrieved 04/12/2022.

32. Field observations in April 2023 and Learning journeys 2022.

- **Sourcing Day-Old Chicks:** Securing enough quality day-old chicks is challenging because larger producers are often given priority. The day-old chick industry is concentrated in Gauteng, the Cape, KwaZulu-Natal and Northwest regions, which poses logistical issues. The long distances to farms can lead to high chick mortality.
- **Limited Access to Abattoirs:** The lack of access to abattoirs/slaughterhouses for processing and selling in formal markets is problematic. The small volumes produced and their location is a disadvantage when it comes to supplying the retail sector. It pushes many emerging farmers to sell live birds in the informal sector (SAPA 2019).
- **Operational Challenges:** Farmers face various challenges, such as poor facilities, lack of funding for expansion, high mortality rates due to disease, bird theft (linked to unemployment and crime), and problems with the electricity and water supply (SAPA 2019). The energy supply is a critical issue and several poultry farms are experiencing operational difficulties due to an irregular power supply.³³

Pumpkin: Potential for Local Food Security

Pumpkin was chosen as a focus crop because of its importance in terms of local and regional consumption. It is affordable, easy to store and accessible to low-income populations, particularly during the “hungry months.”³⁴ However, as data on the pumpkin VC is scarce, further research is needed to fill the gap.

General Structure and Activities

The CWD is a predominantly horticultural region. Horticulture accounts for 60% of farm income, which reflects its importance in the Western Cape's agricultural economy (WCG, 2021) (see Section 5.2). The volume price trend indicator shows that annual vegetable crops make a major contribution to the national agricultural industry. They also contribute directly and indirectly to various agricultural sectors, which in turn boosts job creation and income generation.

The performance of the vegetable industry in the Western Cape is very dependent on climatic conditions, which impact crop production at all stages, from cultivation to market readiness. Key climatic challenges include drought, flooding, hail and heatwaves. Drought, in particular, has increasingly affected vegetable production. Reports suggest that some farmers have even reduced or abandoned

vegetable growing in favour of fruit production. In fact, at least half of the vegetables sold at the Cape Town market are sourced from the northern parts of the country. This reflects the regional disparity in vegetable production.

Production and Basic Processing

Pumpkins, butternut squash and squash in general belong to the same family (Cucurbitaceae). Each has unique characteristics and uses. Pumpkins are a staple food and have been cultivated for hundreds of years. They are often used in sweet dishes, such as pies and muffins, as well as in soups, stews and sauces. Butternut squash, with its cylindrical shape and neck, is often used in savoury dishes. It can be roasted, boiled or puréed for soups. It has become a favourite among consumers because of its size, colour and sweetness. In South Africa, popular summer squash varieties include butternut, Hubbard and gem squash.

Cultivating butternut squash (*Cucurbita moschata*) is relatively straightforward. Soil preparation, irrigation and planting techniques are designed to optimize growth and yield. Seeds are planted directly in prepared rows, either by hand or with mechanical planters. Butternuts are typically grown on ridges to facilitate water runoff and enhance growing conditions during wet seasons. They are planted all year round. The harvesting period and pest control are key factors in butternut squash production. Marketing strategies focus on understanding the market demand, for example: choosing the right cultivar to meet market demand; targeting supermarkets or processors, which have different preferences. Quality is paramount, with emphasis on the supply of gourds of regular size and appearance. The best prices are usually obtained from August to October when there is frost in other regions. Figure 15 shows the pumpkin fields and broiler units in BVM.

The cultivation practices for pumpkin are similar to those for butternut. However, less detailed information is available on the specific production and marketing environments for pumpkins in South Africa. Native to Central America and Mexico, pumpkins are now grown on six continents and produced countrywide in South Africa. They are extensively cultivated in the Mpumalanga Highveld and Lowveld, Vryburg in North West, Western Cape and Vereeniging in Gauteng.

Winter squash is a warm-season crop that is fairly easy to grow. It takes 85–90 days to mature and can be stored for long periods postharvest. Pumpkins have many important feeder roots near the surface. Suitable for most soil types, except low and poorly drained

33. Interview, municipal representative, BVM April 2023.

34. Interview, social assistance association, BVM April 2023.

Figure 15: Map of pumpkin fields (pink) and chicken broiler units in BVM



Source: CapeFarmMapper, Google Earth, 2024.

soils, it thrives in association with vines. Seedlings need regular watering. Although pumpkins are somewhat drought-resistant, prolonged dry periods can adversely affect fruiting. Overly wet conditions can lead to root rot. Weed control is essential throughout the growth period and can be labour intensive. As plants near maturity, their foliage typically covers most of the soil, shading out weeds. Growing squash from seedlings has several advantages, including shorter risk periods and reduced costs associated with irrigation, as well as pest and disease control. Farmers growing from seedlings with appropriate spacing and irrigation can produce from 20 to 30 tons per hectare. Each plant produces 3–6 fruit weighing 2–5 kg.

Between 2012 and 2022, South Africa produced an average of 294 000 tons of pumpkins, squash and other gourds, including butternut.³⁵ In the same period, the country exported an average of 17 000 tons, which confirms that the bulk of the crop is consumed locally. Nonetheless, South Africa exports more pumpkins, mostly butternuts (in metric tons), than any other vegetable crop.

In the BVM region, the pumpkin VC is in its early stages of development. Its structure is dispersed. Interviews indicate that there are numerous scattered small producers and only 2–3 large producers, who manage basic on-farm processing (cutting) and packaging.³⁶ The VC employs both permanent and seasonal workers, the latter are hired primarily for harvesting. Although harvesting, pesticide application and processing/packing require considerable labour inputs, the pumpkin VC overall is not that labour intensive. The sector has seen a shift in labour demographics. Formerly, workers were predominantly Coloured, but many are now Zimbabwean.³⁷ Pumpkin is also studied in the context of food gardening activities. However, further research is needed to examine the differences between community and household gardening activities and the diverse constraints, such as space and security.³⁸

The date of harvest depends on the cultivar. Butternut and pumpkin are harvested when the fruit has fully matured and its skin is hard. The harvested fruit is hardy and can be left in the field for up to two months.

35. FAO Stat. <https://www.fao.org/faostat/en/#data/> retrieved Jan 16 2024.

36. Interview with pumpkin farmer, BVM, April 2023.

37. Interview with pumpkin farmer, BVM April 2023.

38. Representative of Stellenbosch Rural Clinic, BVM, April 2023.

Supply of Seeds and Fertilizer

To meet market demands, companies like Starke Ayres are developing new butternut squash varieties to enhance their product range. Starke Ayres is a global supplier of vegetable, flower and lawn seed varieties. As a specialist breeder, it aims to develop new improved varieties with better disease resistance, longer shelf life and enhanced nutritional value to meet the stringent quality requirements of the export market.

Various companies in South Africa, including Moperi Products, MayFord Seeds and Star South supply vegetable seedlings, including pumpkin. Some companies, such as Hishtil's, are based in the Western Cape. The region also sources seeds from the international market. Southern Hemisphere Seeds, for example, sells a wide range of butternut seeds.

Traditionally, pesticide use was minimal. However, the recent shift towards farm diversification (for financial reasons), seems to have caused an increase in pest abundance. As a consequence, farmers throughout the BVM region are using more pesticides on crops, in general. It raises questions about whether new practices might lead to a dependency on certain inputs, thereby increasing vulnerability to price shocks. Enviro Bio-Chem, a leading agrochemical company in the Western Cape, specializes in manufacturing and distributing a comprehensive range of bio-chemical products for various crops, including vegetables. Their products include herbicides, insecticides, pesticides and fungicides. Henchem also provides a broad spectrum of pest control solutions, such as insecticides, baits, fumigants and rodenticides.

Distribution

In South Africa, as in the Western Cape, pumpkin production is primarily intended for local consumption. Thus, most pumpkin and butternut squash transactions occur at fresh produce markets. For example, the Western Cape Government reported volumes sold at Cape Town's fresh produce market in January 2023, where pumpkin sales amounted to 394.1 tons (R3641.4 per ton), and butternut squash reached a volume of 780.2 tons (R4239.6 per ton) (Dhlamini, 2023). The local market demands high-quality fruit, good storage capacity and high yield potential. However, as already mentioned, a significant portion of the Western Cape's production is intended for export and must meet even more stringent quality standards.

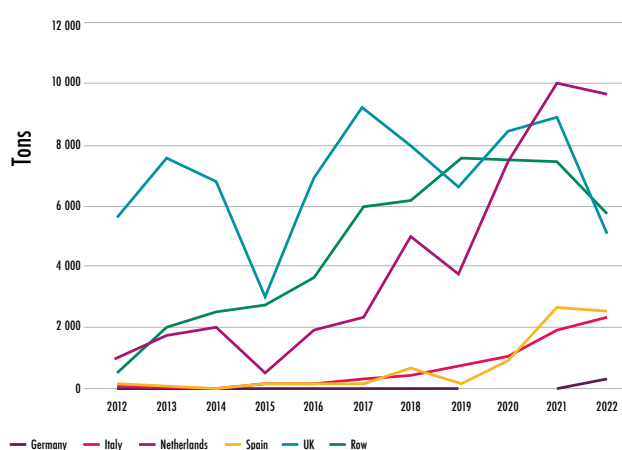
The Farmers Weekly South Africa confirms that the majority of the country's pumpkin production is sold at national fresh produce markets. However, it shows that exports are increasing. Agribook Digital reports that in the 2020/21 season, South Africa's butternut exports went to the UK (44%) and Europe (39%), with the Middle East (14%) also representing a significant

market. Figure 16 shows the overall trend in exports over the past decade. While the Netherlands is the major trading partner, most commodities are transited through Rotterdam to the UK, Germany and other north European countries.

The growing international interest in healthy lifestyles has spurred a considerable increase in exports to the EU. As local prices for pumpkin and butternut have stagnated, the local market is less attractive for producers compared to the potential of exports. Exporters play an essential role as intermediaries between farmers and foreign buyers. They handle logistics, adhere to international standards and often provide assistance for marketing, as well as buyer acquisition. Market trends indicate that both retailers and producers are looking for smaller pumpkin and butternut varieties that are easier to pack in order to meet consumer demand.

One pumpkin producer interviewed described the lack of formal organizations for pumpkins in the Western Cape. Most pumpkins are sold at the local market, either at farm stalls or by local street vendors, who buy directly from farmers. Unprocessed pumpkins and butternuts are favoured because they have a long shelf life and are easy to transport. The group Star South combines local production with a strong export focus. It exports high-quality butternuts to different regions. Another key player is BeFresh, a Western Cape-based butternut packer and trader. It takes advantage of the comparatively short growing season in Europe to export substantial volumes of butternuts. The export market is concentrated among a few major exporters.

Figure 16: Metric tons of exported butternut/pumpkins (2012–2022)



Source: FAOStat, accessed 16/01/2024

>>> 4.3 THE LINKS BETWEEN THE BVM FOOD SYSTEM AND THE CWD, THE WESTERN CAPE PROVINCE AND BROADER SCALES

The Western Cape Province is known for its comparative advantage in diverse agricultural sub-sectors. It has developed dynamic food flows and connections with the nearby BVM. However, the situation in the BVM area is paradoxical. Despite its rich agricultural output, the food supply in Worcester city does not reflect the abundance of locally produced food. This significant finding emerged from Learning Journeys in the region. Food availability in Worcester and the BVM hinges on local production, with regional contributions from within the CWD and the Western Cape, other South African regions and international imports.

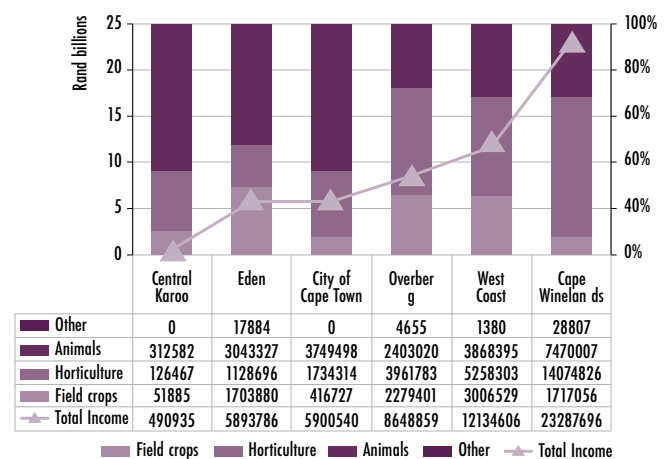
To further explore the situation, we analysed 2017/2018 GIS data from the Western Cape Department of Agriculture and the 2017 Census of Commercial Agriculture, with a focus on the BVM. Our analysis was limited for various reasons: (i) It was not possible to link highly processed foods or foods made from multiple commodities to production data, (ii) There was a discrepancy between the food categories used for a dietary intake survey and those used in an agricultural census, and (iii) There was a discrepancy between local production and actual consumption in Worcester. Therefore, our qualitative analysis of local food flows also drew on interviews and Learning Journeys.

Figure 17 highlights the Cape Winelands District's key role in developing the province's agricultural economy. Figure 18 presents a schematic illustration of the imports and exports of key food products from BVM.

The CWD is a key **horticultural region**, contributing over 30% to the provincial agricultural gross value added. The Langeberg Municipality plays a crucial role in this sector (WCG, 2021). There is a tomato canning factory in Montagu, which is extremely important for the tomato value chain. Common vegetables, such as pumpkins, spinach, cabbage and squash make a vital contribution to the diets of vulnerable groups. They are processed and distributed through various outlets, including street vendors.³⁹ Spinach is culturally significant, especially in Coloured communities. It plays an important role in terms of dietary preferences (see Section 3.3).

Citrus fruit, including lemons and oranges, represents a burgeoning industry in the CWD and the Western

Figure 17: Western Cape break down of gross farm income by district (2017)



Source: Western Cape agriculture sector profile 2021.

Cape, which ranked the third largest citrus producing area in South Africa in 2017, with 12,136 hectares (CGA, 2017). By 2021, citrus was the leading export from the Cape Winelands, making up 18.42% of the total exports, just behind Limpopo and Eastern Cape (Wesgrow 2022). The citrus sector is growing in areas where irrigation water is available, often to the detriment of other irrigated crops, such as potatoes or wine grapes. The Robertson/Ashton areas, initially influenced by the neighbouring Ceres District, are now experiencing rapid growth in citrus planting. The expansion is partly due to diversification efforts by wine and table grape growers and the Economic Transformation of Black Citrus Growers Programme (Citrus Growers Association 2020).

The Western Cape is also prominent in the **dairy sector**. It is the largest milk supplier in South Africa and produces over 25% of the nation's milk. Aquaculture is an emerging industry, centred around Hermanus (Overstrand). Fish is a staple food for vulnerable populations in the BVM (Gonzalez 2023). The BVM region has links with international agri-food markets through the import of raw and processed foods from both African and non-African countries. It also has links with small niche markets for indigenous African crops, such as *kapenta*, Bambara nut and cowpea (EDP et al., 2022).⁴⁰

Deciduous fruit, poultry, winter grains (e.g. wheat), potatoes and vegetables are essential for the food security and nutrition of the BVM population. Food in the region is derived from **a combination of local and imported produce**. Worcester sources most fruit and vegetables locally, but still relies on imports for certain

39. Representative of extension services, interview, BVM April 2023.

40. Kapenta are dried fish from several pelagic species not traditionally eaten in South Africa. However, since being introduced by immigrants, Kapenta are now reportedly bought by South Africans.

products. Despite local production capacity, retailers continue to import broiler chickens from different countries, highlighting a reliance on international sources for poultry. Vitamin A-rich vegetables and tubers, such as pumpkins, carrots and butternut squash are produced abundantly in the BVM. Yet, wholesalers who supply informal vendors may buy goods from outside the BVM or on the international market (EDP *et al.*, 2022).

Some essential dietary items **are not produced in the BVM foodshed**. For example, this is the case for maize, rice, coffee, tea and several vegetables (see Table 2):

- Maize is primarily produced in Free-State, North-West Province, Mpumalanga Province, Limpopo Province and Eastern Cape Province.

- Rice is generally imported. South Africa bought 1.1 million tons in 2022, accounting for 7% of its total import expenditure (Harvest SA, 2023). The CWD does not produce rice. However, it is home to large distributors, such as Pioneer Foods, which markets Spekko rice. This is a major retail brand, based in Paarl, which sells different rice varieties, mainly sourced from Thailand (Western Cape Government, 2023). National rice imports come from Thailand (76.5%), India (19.1%), and Pakistan (1.8%), with a per capita availability of about 15 kg annually (Harvest SA, 2023).

- Sugar is primarily produced in KwaZulu-Natal.

- Rooibos tea, an alternative to black teas, is produced in areas near BVM. It is important to note that although tea and coffee consumption is high in Worcester according to the F4C dataset, their nutritional value is minimal.

A complement perspective to the one focused on the most consumed food items is to use the food items that contribute the most, in terms of kcal, to the food and nutrition security of the population living in the BVM. Table 3 presents the food items that contribute at least 10% to daily kcal intake. Commercial bread (wheat) comes first, despite the fact that wheat is not produced in the BVM. It is grown in the CWD (i.e. the BVM foodshed) and Western Cape province. In fact, they are major producing areas, especially the West Coast and Overberg, which produce enough to meet most of the country's requirements (WCG, 2016). Grain production is mechanized and employs few staff (Greenskills 2019), but the grain VC remains important.

Over and above issues, such as infrastructure, access to land and water, logistics, and the orientation of food chains towards Cape Town and international markets, access to locally produced food in the BVM area is also limited by income disparity. Stakeholders in the food chain export produce because of the

Table 2: Major food groups consumed in Worcester but not produced in BVM foodshed

Food Item	% 24-hr (households)	24-hr Rank
Coffee or tea	68.56	1
Sugar (includes white or brown sugar, honey, syrups)	58.52	2
Rice (includes sticky rice, rice noodle, white rice, brown rice)	51.32	4
Maize (includes maize meal, samp and cooked medlies)	22.62	14

Source: Author's calculations using 2019 F4C dataset.

Table 3: Contribution of food groups to dietary energy intake

Food group	kcal (m)	kcal %
Commercial bread	7 903	17.6
Sugar	7 804	17.4
Cooking oil	7 775	17.3
Maize	5 904	13.1

Source: Author's calculations based on population census, the 2019 F4C dataset and the one-week expenditure recall from the 2014/15 Living Conditions Survey.

economic incentives. As a result, similar food items are often unaffordable for the area's most vulnerable consumers. Indeed, prices can be prohibitive for residents, who mainly depend on their income for food. One informal trader pointed out the paradox: locally grown produce is transported to Cape Town and sold back at triple the price due to transport and intermediary costs. This situation is exacerbated by the limited retail alternatives and the shift towards agricultural specialization, with commercial farms focusing on high-value exports over local food needs.

This focus is likely to be a growing concern regarding food availability for the local population. According to a commercial farmer, survival in the farming business is only possible if farms specialize: *"The small farms are all disappearing. And the big farms, the problem with them is that they only do what's, like, absolute good money, whereas smaller farmers do things that fit into all sorts of different places. So, like a place like mine, I do butternut, I do tomatoes, I do my stone fruit [that can be sold on the domestic market]."*⁴¹ One representative of a water association also confirms

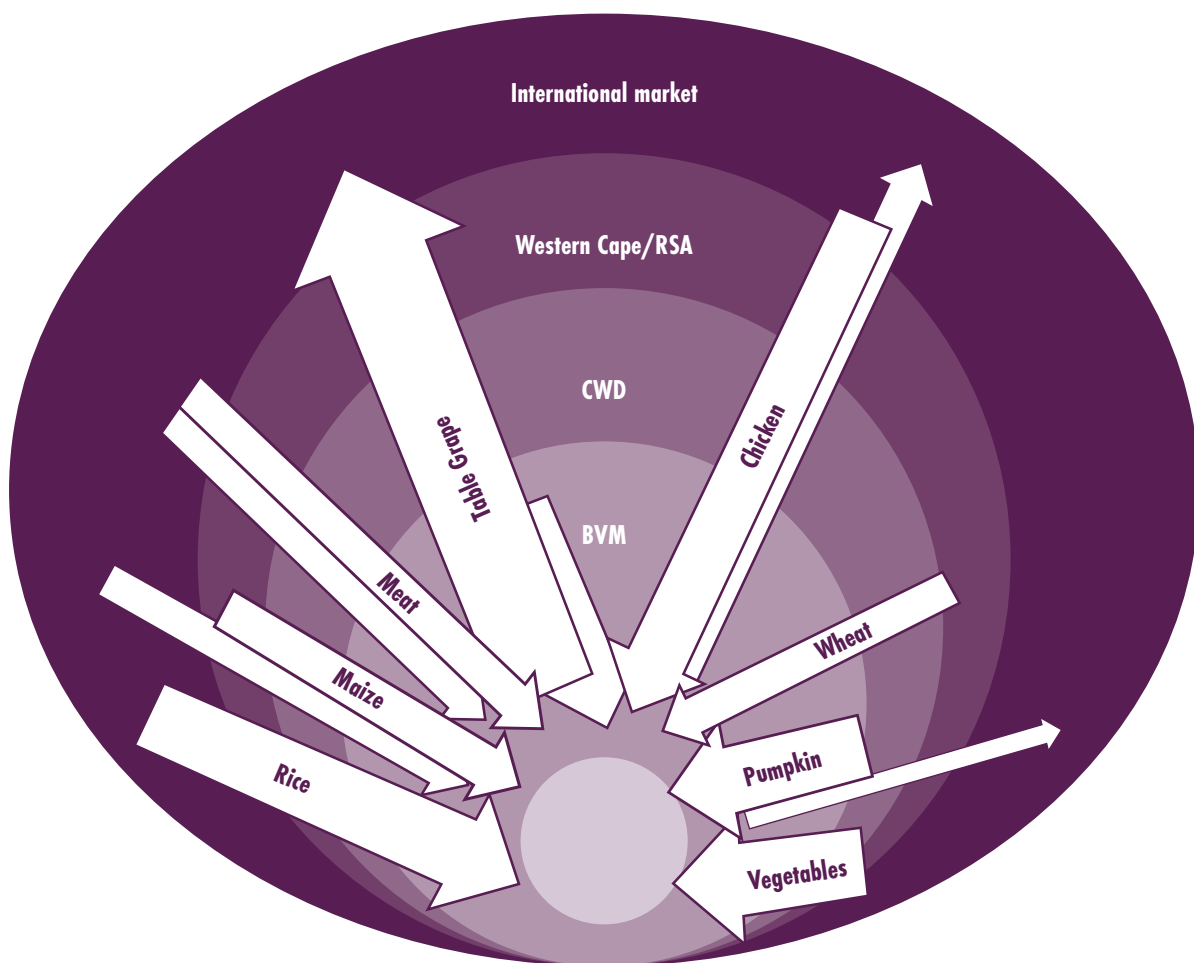
41. Interview with a commercial farmer in the table grape industry, BVM April 2023.

that “properties are too expensive here to grow veggies”. Farmers have invested heavily, which is why they target the high-value export market.

The BVM’s core food system mirrors national agricultural and development policies. Historically, the priority has been to develop intensive, commercial systems to maximize output, efficiency and profitability for national food security. The outcome is a highly

unequal food system, which neglects social, cultural and ecological factors, as well as nutrition and health concerns. This situation highlights the need for a shift towards a more place-based food system, which considers local needs and sustainability. Lastly, while this report has focused on agriculture, other industries and sectors, such as tourism, finance, real estate, business services and social services also have a major impact on the CWD economy (GWC, 2017).

Figure 18: Schematic illustration of the import and export of key food products from the BVM



Source: Authors' illustration based on WCG, 2020.





5

The Challenging Path to a Resilient Food System

This subsection provides an analysis of the resilience of the BVM food system. It focuses on the food system's capacity to maintain or improve outcomes in response to shocks. In particular, we examine its ability to produce and provide access to nutritious and culturally acceptable food. First, we examine the outcomes of the core food system, its trade-offs and co-benefits. Then, we present the main risks and vulnerability factors, as identified by key food system stakeholders. While some stakeholders have observed certain impacts of increasing climate variability, many view climate change as a long-term challenge, which is less urgent than other structural and socio-economic constraints. Lastly, we explore various territorial strategies that aim to enhance sustainability and strengthen the food system's resilience against climate related hazards and other shocks.

5.1 OUTCOMES OF THE BVM FOOD SYSTEM

Food and Nutrition Security: Increasing Rates of Malnutrition

The BVM core food system is faced with different challenges. Its inherent inequalities significantly impact the food and nutrition security of the municipality's large vulnerable population, most of whom live in Worcester and the surrounding rural towns. Recent indicators of food insecurity, anthropometry and dietary diversity suggest that Worcester's food and nutrition security is critically challenged. According to some interviewees, the situation has worsened in recent years, particularly due to the Covid-19 crisis. A representative from a civil society organization reported an increase in soup kitchens from three to seven in three years.⁴² A dietician explained that Covid-19 disrupted positive nutrition trends, particularly in areas like Stofland, an informal settlement adjoining the town of De Doorns. It exacerbated financial difficulties and increased migration from Eastern Cape, Zimbabwe or Lesotho.⁴³

Similarly, the F4C survey in Worcester indicated that 40% of respondents faced moderate food insecurity, while 15% experienced severe food insecurity, as measured by the Food Insecurity Experience Scale (Davis *et al.*, 2022). These rates surpass the national figures, which were 20% for moderate and 15% for severe food insecurity in 2020/2022 (FAO *et al.*, 2023). Food insecurity was found to be more common among Black African respondents compared to White respondents. The study also made the link between food insecurity and dependence on food assistance.

Higher levels of insecurity were reported in poorer neighbourhoods (Davis *et al.*, 2022).

Furthermore, the BVM food system has contributed to severe nutritional challenges, including widespread child stunting and a rise in diet-related, non-communicable diseases among adults (Davis *et al.*, 2022). In 2011, Balogun *et al.* (2015) conducted a study in Avian Park and Zwelethemba. They focused on children aged 12-36 months and found their folate, calcium and selenium intake to be well below the recommended levels. Additional research on stunting in children under five in vulnerable communities (Avian Park, Riverview, Roodewal, Zwelethemba), revealed widespread under- and overnutrition among children and mothers. It highlighted a significant double burden of malnutrition within families and established a clear link between low dietary diversity and child stunting (Lenhoff, 2020). The high incidence of child malnutrition in impoverished neighbourhoods is of critical concern. An interviewee referred to initiatives by the Rural Clinic School in Stofland, De Doorns, indicating that 27% of children in the area were stunted, a figure aligning closely with national statistics and slightly higher than the 23% in Western Cape (Matlwa Mabaso *et al.*, 2021). The Rural Clinic School began its work with dietetics students in 2012. It chose to work in Stofland because 60% of children admitted to the Worcester Hospital for malnutrition were from this community.⁴⁴

Lastly, the adult population also faces nutritional issues, with a notable risk of micronutrient deficiencies. This is highlighted by the Women's Dietary Diversity Score (WDDS), a metric for assessing dietary diversity. It yielded an average score of 3.45 among 986 respondents in the F4C survey, on a scale with a maximum of 9. The scores show no significant gender difference, with women averaging 3.43 and men 3.49. An analysis by population group indicates that Black African respondents have the lowest average WDDS at 3.29, whereas the White population group records the highest at 3.76 (Figure 19). The analysis also reveals the lowest WDDS scores in the poorest quintile (Q1), predominantly Black Africans, and the highest in the wealthiest quintile (Q5). The significant difference between the second and third quintiles is worthy of note (Figure 20).

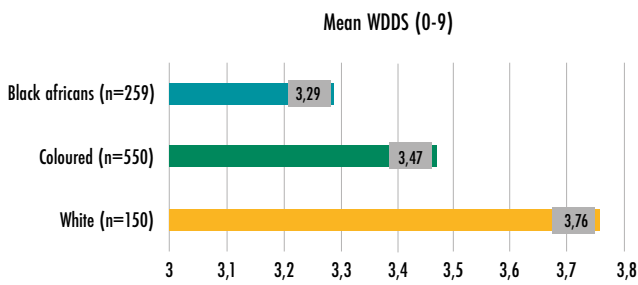
These findings, consistent with Davis *et al.* (2022), confirm a **strong correlation between dietary diversity and food poverty**. We also found that low-income neighbourhoods with limited access to supermarkets, such as Avian Park and Zwelethemba, have less dietary diversity on average. One interviewee pointed out

42. Interview, representative of civil society organisation, BVM April 2023.

43. Interview, representative of the Stellenbosch Rural Clinic, BVM April 2023.

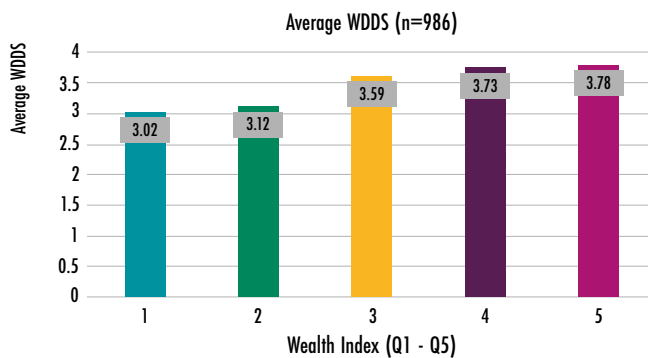
44. Interview, representative of Stellenbosch Rural Clinic, BVM April 2023.

Figure 19: Women Dietary Diversity Score by population group (n = 983)



Source: author's calculations using 2019 F4C dataset.

Figure 20: Mean Women Dietary Diversity Score by Wealth Index



Source: author's calculations using 2019 F4C dataset.

the severe nutritional challenges facing migrants, especially as language barriers hinder access to crucial health services, such as family planning, birth control, de-worming and child nutritional supplements⁴⁵. In addition, unemployment and unstable employment greatly impact food and nutrition security. As one interviewee highlighted, *"The bigger influence [to food and nutrition insecurity] is around people that do not have work, unemployment and their living circumstance with poor sanitation and hygiene"*⁴⁶. In agriculture, working conditions critically affect food and nutrition security. Farm workers often support multiple family members (BFAP, 2012).

With continued population growth and limited access to land for agriculture, Worcester's residents largely depend on income for gaining access to food. Thus, self-consumption plays a minor role. Yet, food is perceived to be very pricy in the Worcester area. A

prominent informal trader highlights a paradox: *"the Breede valley is the breadbasket of the Western Cape [...] but most people cannot afford buying things that are produced here"*. He criticizes the local government's failure to provide adequate space and facilities for informal trade or for a fresh produce market in Worcester, arguing that it would bring the price down for local consumers. He deplores the fact that: *"[the local food production] gets shipped directly to Cape Town [...] and] when it comes back here in retailers' shops, its price has tripled"*,⁴⁷ largely due to transport costs and the additional margin claimed by new intermediaries along the supply chain. Finally, limited opportunities to circumvent large retailers and a trend towards agricultural specialization—where commercial farms prioritize lucrative exports over diverse, local food production—threaten the future availability of food products for the local population, exacerbating the disappearance of small farms and altering the agricultural landscape (see Section 4.3).

Socio-Economic Effects: Job Creation Amid Precarious Employment

The high demand for goods and services, from both upstream and downstream support industries in the table grape VC, contributes to socio-economic activities in the BVM region. Indeed, the sector is renowned for generating indirect employment in other industries, such as tourism, in areas where table grapes are cultivated.

However, as outlined in Section 3.2, the regulatory changes and shifts in agricultural production practices have exacerbated tensions in the BVM, linked to the increase in **seasonal work**. These changes were intensified by the post-1994 economic reforms, which ended subsidies for commercial farmers and opened up the international markets. This led to consolidation in the agricultural sector. There are now larger, globally competitive enterprises, which are increasingly mechanized. There has been a corresponding shift from permanent to seasonal labour (Webb, 2017). For example, table grape farms primarily employ full-time workers for specialist tasks, such as pruning and training vines. Other tasks include thinning during flowering and the first four weeks of fruit growth, harvest supervision, packhouse operations, irrigation management, seasonal pest and disease monitoring, tractor or forklift operations and grafting. Seasonal labour, on the other hand, is typically hired for fixed periods for harvesting or fruit packing (DALRRD 2020).

45. Interview, representative of Stellenbosch Rural Clinic, BVM April 2023

46. Interview, representative of Stellenbosch Rural Clinic, BVM April 2023.

47. Interview informal trader, Worcester, BVM February 2024.

In the Hex River Valley, a significant shift in agricultural employment patterns occurred between 2007/08 and 2013/14. Total employment decreased by 17%, with a dramatic 53% reduction in permanent jobs and a 38% rise in seasonal jobs. This altered the full-time to seasonal worker ratio from 61:39 to 35:65 in favour of seasonal labour (Visser & Ferrer, 2015). Interviews suggest a more extreme shift, especially in processing activities, with indications of a 90:10 ratio in the Hex River area, compared to 85:15 nationally.⁴⁸ Despite these changes, the total employment decline has stabilized since 2018. According to SATI, the number of permanent workers has settled between 4,600 and 4,900, while seasonal employment has risen from 12,400 to 17,700 over the last five years (Table 4).

In this context, the rise in **labour brokering** has become a significant phenomenon. Labour brokers provide the link between the growing demand for seasonal labour and worker availability. They have become crucial intermediaries in the transformed agricultural landscape. Brokers facilitate the recruitment of seasonal workers for short-term and flexible tasks, particularly in less mechanized sectors. Secondary data indicates that during the peak season, around 80% of the workforce is South African (from BVM, Western Cape or other provinces). The remaining 20% are foreign nationals from Zimbabwe (15%) and Lesotho (5%). In the off-season, the proportion of foreign workers decreases to 16.5% (Freeman & Leandri Pretorius, 2017). Growers in the Western Cape acknowledge that contractors make their work easier, by managing logistics and administration.

As one farmer explained, contractors are often seen negatively, but they actually protect jobs and serve the fruit industry well. He added, “How do I keep them busy during the other five months? I think all the new laws just cause more unemployment” (Genis, 2018, p. 36).

While this system responds to the variable labour needs of contemporary agriculture, it introduces precarity and instability into the lives of workers.

The absence of job security and the transient nature of seasonal work often cause socio-economic vulnerability among workers. This in turn leads to the expansion of informal settlements and has a significant impact on labour relations (Theron & Visser, 2012; Webb, 2017). The increasing reliance on seasonal labour is a major challenge for labour organizations. South African trade unions are traditionally urban-based. They have found it difficult to adapt to the fragmented rural labour market. The persistent paternalistic labour relations on farms represent a further challenge (Webb, 2017).

The reliance on seasonal employment has generated a high employee turnover. New workers often require training at the start of each season, which complicates the training and retention of skilled workers. **Fruit producers** and packing shed managers, in particular, require workers with better education and skills to improve efficiency and meet the complex quality standards set by supermarkets. However, both public and private training providers lack the resources to train a sufficient number of skilled workers (Barrientos

Table 4: Number of farm workers in table grape industry, 2018 to 2023

Region	2017/2018		2018/2019		2019/2020		2020/2021		2021/2022		2022/2023	
	Seasonal	Permanent	Seasonal	Permanent	Seasonal	Permanent	Seasonal	Permanent	Seasonal	Permanent	Seasonal	Permanent
Berg River	10,896	2,169	16,879	2,907	17,252	3,129	19,196	3,677	19,521	3,772	20,427	3,285
Hex River	8,360	3,417	12,411	4,630	12,782	4,750	13,885	4,791	16,440	4,989	17,707	4,926
Northern provinces	9,325	1,468	9,624	1,785	10,694	2,144	13,369	2,122	13,187	2,158	13,391	2,217
Olifants River	3,994	723	4,173	807	4,247	784	4,509	795	4,712	843	4,761	737
Orange River	16,926	1,975	19,121	2,483	20,188	2,700	23,049	2,708	27,600	3,534	30,590	3,678
Sub-total	49,591	9,752	62,208	12,612	65,163	13,507	74,008	14,093	81,460	15,296	86,876	14,843
TOTAL	59,343		74,820		78,670		88,101		96,756		101,719	

Source: Compiled from DALRRD 2020 and SATI statistics (2020-2023).

48. Interview, former table grape grower, BVM April 2023.

& Visser, 2013). Furthermore, commercial farmers state that the recent rise in the country's minimum wage has increased their financial burden.⁴⁹ A National Minimum Wage was introduced in 2018, set above the agricultural sector's previous standard. In response, farmers have reorganized and rationalized their workforce. They have increased mechanization and casualization to curb labour needs, rather than create jobs (Genis 2018).

The **broiler sector** indirectly benefits livelihoods. By-products are used in the preparation and sale of poultry-based street food, such as grilled chicken feet.⁵⁰ However, the 2021 avian flu outbreak in Worcester affected broiler breeder farms and resulted in export bans to countries, such as Botswana (WCG, 2022). Sanitary risks of this kind pose significant challenges for employment in the value chain, as demonstrated during the 2017 national crisis. For instance, Rainbow Chicken had to lay off 1,200 workers and sell 15 of its 25 farms to stay afloat. This demonstrates the intense pressure on the South African poultry industry. *"For thousands of workers to lose their jobs at a time when economic growth is stagnant and job losses across the country are at an all-time high is nothing short of a disaster. The South African poultry industry is in dire stress and in an absolute crisis."* (The Mercury Editorial, 2017). Furthermore, sector policies targeting local commercial production and formal markets, with emphasis on affordability, tend to ignore wider system implications. As a result, unintended outcomes may threaten sustainability and deepen inequality. The emphasis on affordability can compromise health. For example, promoting frozen and ultra-processed foods heightens the risks of spreading non-communicable diseases (Queenan *et al.*, 2022).

This study highlights the agricultural sector's segmented labour demand. It also reveals the situation in the BVM, where the economy has failed to generate sufficient jobs and employment of quality. This has led to a rise in unemployment (up to 15% in 2021) and in the number of job-seekers or non-economically active. This group is more vulnerable during economic downturns, which directly impacts their food security (WCG 2022).

Territorial Balance: Planning Efforts Amid High Spatial Inequality

The table grape and broader fruit sectors have an important role in terms of generating direct and

indirect employment. However, the high seasonality and unstable labour market in the sectors undermine territorial balance. The shift from on-farm to off-farm seasonal labour recruitment marks a significant change in rural labour dynamics. Many permanent farm workers have been displaced from farm housing. The resulting influx in informal settlements across the province, exacerbated by migration from other areas, has intensified territorial inequalities (Webb, 2017). The 1997 ESTA, which initially aimed to secure land use and housing rights for agricultural workers, has paradoxically resulted in widespread evictions and increased hardship in townships and informal settlements in the BVM⁵¹ (see Section 3). De Doorns, a case in point, was significantly impacted by the 2012–2013 strikes. According to a local representative,

*We understood that there [was] major change after the 1997 [ESTA]. (...) This fed the informal settlements. (...) For instance, if there's a family going off from the farm, they demolish that house. It's not the workers, it's the family and the cousins and everyone that's living [there]. That's where the problem starts. So, they [commercial farms] just don't take people in anymore. They go and take workers from the outside just to come and work and then you go back to wherever you live.*⁵²

There is a general recognition of the public sector's failure to provide basic services to residents in informal settlements. As noted, *"Exactly because it is not planned for, it is difficult to provide certain services, such as sewage, water, and so on."*⁵³ Despite these challenges, public authorities are seeking to address spatial inequality in the BVM and include vulnerable population groups in the planning process. For instance, the Integrated Development Plan (IDP) combines sector plans across various services to ensure a comprehensive development strategy. According to one interviewee, the IDP is genuinely committed to meeting community needs and priorities. This inclusive approach is crucial for addressing the complex challenges posed by informal settlements, where basic services, such as water, sewage and electricity are urgently needed. However, this approach also faces the challenge of aligning community expectations with the mandate and capacities of local institutions.⁵⁴

Furthermore, the increase in the number of land requests submitted to the municipality has become a significant issue. It reflects the changing socio-

49. Interview, table grape grower and processor, BVM April 2023.

50. Learning Journey, 2022.

51. Parliamentary Monitoring Group webpage: <https://pmg.org.za/committee-meeting/34671/>, retrieved April 4 2022.

52. Interview, food assistance organization in informal settlements, BVM April 2023.

53. Interview, municipal planning representative, BVM April 2023.

54. Interview, municipal representative, BVM April 2023.

economic dynamics in the community. It is worth noting that in South Africa, municipalities are the main authorities responsible for land planning and management. Their remit also includes land for agricultural purposes. The Spatial Planning and Land Use Management Act of 2013 targets sustainable land management and use, equity in land use decisions, efficient land use planning and the integration of diverse elements in development planning. Provincial governments play a supporting role, providing guidance, technical support and dispute resolution.

According to interviews,⁵⁵ the municipality conducts an evaluation to identify potential uses for vacant land and buildings, which may belong to different levels of government. The process of formalizing the development of these areas often involves negotiations with landowners. Comprehensive planning is also required to extend infrastructure capacity. The municipality must balance the various demands against the risk of land grabs, a growing concern in the country.

Environmental Footprint: Growing Pressure on Water Resources

With an average annual rainfall of only 470 mm, South Africa is grappling with water scarcity. This is a major concern for the table grape industry, which is heavily dependent on irrigation (Sigadla *et al.*, 2022). The industry covers 21,100 hectares, putting considerable strain on local and regional water resources (Myburgh, 2011b, 2011a; Permanhani *et al.*, 2016). Research on the water footprint and water-use efficiency of table grape production in South Africa, though limited (Avenant *et al.*, 2017; Jarman, 2020; Pahlow *et al.*, 2015), indicates a substantial regional variability in terms of irrigation needs. For example, the blue water footprint, which is based on the irrigation volume (m³/ha) for Crimson Seedless, is significantly lower in the Hex River Valley at 202 m³/kg compared to 2,705 m³/kg in the Orange River region. The discrepancy is largely due to differences in evaporative demand and irrigation practices (Sigadla *et al.*, 2022).

The water crisis was particularly acute during the 2017/2018 and 2018/2019 seasons, when severe drought and water restrictions forced producers to adopt conservation measures. In some cases, restrictions led to the complete removal of vineyards (Jarman, 2020; Sigadla *et al.*, 2022). During droughts, agriculture is deprioritized under national regulations. In this context, Lanari *et al.* (2021) observed that many farmers sought to navigate uncertainty, by drilling boreholes and building on-farm dams, with or without a permit.

A common belief held in the farming community is that groundwater use escapes the stringent water restrictions applied during droughts. A manager of a prominent Water User Association recalls the height of the Cape water crisis between 2016 and 2018: “[farmers] were restricted on the surface water, but not restricted on the groundwater. So, what they did was they tried to use more groundwater or to make up for that restriction.”⁵⁶ When asked if this coping strategy was legal, the manager acknowledged that the Department of Water and Sanitation (DWS) had considered taking a member of his Water User Association (WUA) to court. However, in his view, the DWS would not win the case because the National Water Act (1998) lacks clarity on this issue.

This interpretation suggests that resorting to groundwater use may have been a widespread practice, which some WUAs condoned as a way to circumvent the water restrictions imposed on the farming sector during periods of drought. Groundwater abstraction increases pressure on water resources. According to one interviewee, South African environmental law suffers from a lack of enforcement. Yet, a major WUA in the vicinity decries the water authorities’ failure to enforce laws, despite ample evidence of unlicensed water use by farmers and of the illegal clearing of protected plants and species (which contravenes the National Environmental Management Act, NEMA). In fact, the downstream WUA is now resolved to hire its own lawyer and take the farmer to court.⁵⁶

Although other food value chains use fewer water resources, there seems to be a trade-off in production planning. Water is often preferentially allocated to grape production. A small-scale producer explained that priority is given to *perennial* not annual crops in a dry summer, which potentially excludes other crops.⁵⁸

The environmental standards, which most table grape producers and exporters must comply with to access international markets, address some of these issues. Private standards and certification, such as GLOBALGAP Certified Organic, complement public standards. They differentiate products and guarantee compliance with specific standards. Private standards are often a prerequisite for exporters (Louw, 2017). Despite efforts by actors, such as the Wine and Agricultural Ethical Trade Association (WIETA) and the Sustainability Initiative South Africa (SIZA), the power imbalances along the global value chain limit the impact on producers and workers (Alford *et al.*, 2021). The effectiveness of standards and their concrete outcomes have triggered debate. Some stakeholders consider that these standards are a minor concern

55. Interview, municipal representative, BVM April 2023.

56. Interview, Water User Association representative, BVM April 2023.

57. Interview Water User Association representative, Robertson, March 2024

58. Interview, pumpkin producer, April 2023.

and are calling for greater harmonization. Some point out the difficulties of incorporating them into conventional production practices, which may divert attention away from social standards. Some producers highlight the contradiction between the market objectives to reduce carbon emissions and the increasing input prices: *“We need to maintain a balance between our goals for CO2 emissions and what is viable and feasible for the world economy to handle. As we chase inputs and transportation costs, everything keeps going up.”*⁵⁹

Unlike table grape production, broiler production is recognized as being the least water-intensive source of animal protein. Nonetheless, poultry production requires significant amounts of water (Cobban & Visser, 2017). It may also cause landscape degradation in surrounding areas. It has a direct environmental impact due to soil and water pollution, caused by the discharge of poultry waste and the use of chemicals in farming operations. In the Western Cape, the poultry processing industry uses substantial amounts of water. On average, it uses approximately 16.7 litres of water per bird. This includes water use for cleaning processing areas, reception, slaughter, scalding, defeathering, evisceration, chilling, general washing and by-product processing. This consumption accounts for an estimated 363,000 m³ in the region (WCG, 2015).

Table 5 provides a non-exhaustive summary of the outcomes of the BVM core food system. It highlights some of the key results for each VC, as well as the competition and co-benefits between outcomes.

>>> 5.2 CLIMATE CHANGE AS A SECONDARY RISK

South Africa’s semi-arid climate and water scarcity make it particularly vulnerable to climate change impacts (Botai *et al.*, 2018). Gbetibouo *et al.* (2010) present an in-depth analysis of this vulnerability in the farming sector, taking into account socio-economic and institutional factors. Following the Intergovernmental Panel on Climate Change’s vulnerability framework (Füssel & Klein, 2006; IPCC, 2007), the study describes South Africa’s exposure to significant climatic variations. Projected climate changes include increased temperatures, changing precipitation patterns and more frequent extreme weather events, such as droughts and floods (Lumsden *et al.*, 2009).

The Western Cape Province, one of South Africa’s driest regions, faces severe challenges from climate change,

particularly with its limited water resources (Scholz & Methner, 2020). Like other regions in the world with a Mediterranean climate, the province faces increased droughts and higher temperatures. These changes cause water deficits during critical crop stages, which affect productivity, especially in rainfed areas and for irrigated crops, such as orchards and vineyards. The instability of water resources also has socio-economic repercussions (Del Pozo *et al.*, 2019). With an annual rainfall of around 350 mm, well below the national average of 500 mm, rainfall variability is critical for the region’s water supply. This is particularly the case in the Breede and Berg River catchments, which have major dams (Blamey *et al.*, 2017, 2018; Dennis & Dennis, 2012). The dams are vital for domestic use and irrigation for agriculture, including viticulture and wheat cultivation. They also support the Cape Town metropolitan area’s industry and tourism.

Despite its preparedness, in terms of better infrastructure, literacy rates and lower unemployment compared to other provinces, the Western Cape has a history of frequent extreme weather events. The severe drought between 2015 and 2017 had widespread impacts. It reduced agricultural output, led to critically low dam levels and stringent water restrictions (Naik & Abiodun, 2020).

In this context, Talanow *et al.* (2021) investigate how grape producers in the Western Cape perceive and adapt to climate change. Drawing on interviews with commercial grain and wine grape farmers, their study reveals that farmers are acutely aware of climate change impacts, such as increased temperatures and droughts, particularly those in the wine industry. However, farmers’ perceptions and responses are shaped by their specific farming contexts. Grape producers report challenges, like increased pest infestations and reduced yields. Similar trends have been observed in other wine regions (Araujo *et al.*, 2016; Ashenfelter & Storchmann, 2016).

The study also examines factors influencing farmers’ adaptive behaviour. It shows varying levels of perceived adaptive capacity. Some farmers feel overwhelmed, while others adopt a problem-solving attitude (Arbuckle *et al.*, 2015). One significant finding is the emergence of a combative approach to climate change, with emphasis on overcoming challenges rather than adapting. Farmers face several adaptation barriers, including institutional, political and economic constraints. These, coupled with concerns about land ownership and economic insecurity, impact future farm employment and rural livelihoods (Hornby *et al.*, 2018).

59. Interview, commercial farmer, BVM April 2023.

Table 5: Synthesis of outcomes of the core food system’s value chains

	Table Grapes	Broiler chicken	Pumpkin
Food and Nutrition Security (FNS)	<p>Income Generation: Contribution to food security through jobs and income generation</p> <p>Conflicts/Trade-offs: High export focus strains local food supply. Issues of employment quality and workers’ health due to chemical use.</p> <p>High export orientation vs. limited domestic market absorption for table grapes produced to international standards.</p> <p>Co-benefits: Significant contributor to food security through income.</p>	<p>National FNS: Key to rural development and government’s zero hunger goals.</p> <p>Local Diets: Major role in South Africa’s diet, affordability.</p> <p>Conflicts/Trade-offs: Growth vs. import reliance and environmental concerns.</p> <p>Risk of avian influenza</p>	<p>Local Diets: Significant in local diets, especially in informal areas; potential for improving nutritional status.</p> <p>Affordability: Essential for local and regional consumption, due to affordability, easy to store and cook.</p> <p>Food Gardening: Supports emerging farmers and community-based food gardening.</p> <p>Trade-offs: Local consumption needs vs. increasing focus on butternut exports. Risk of seasonal gluts.</p> <p>Co-benefits: Primarily oriented towards local markets; supports community development and food security, particularly in periods of crisis.</p>
Socio-Economic Effects	<p>Job Creation: Transition to seasonal labour with major employment opportunities.</p> <p>Labour Quality: Growth in precarious seasonal wage employment and labour brokering, casualization.</p> <p>Wage instability due to seasonal employment.</p> <p>Conflicts/Trade-offs: Economic growth from exports vs. local labour conditions. High export focus strains local supply.</p> <p>Co-benefits: Export-driven regional economic development but with labour vulnerabilities.</p> <p>Significant contribution to regional economic development with intersectoral linkages, including sustainable activities, such as agri-tourism.</p>	<p>Job Creation and Labour Quality: Employment provider with significant potential in wage and self-employment. But job instability due to sector restructuring in highly competitive context.</p> <p>Dominance of commercial production impacts labour demand.</p> <p>Conflicts/Trade-offs: Sector growth and food security vs. environmental and inclusivity challenges. Domestic focus with export potential, but concurrence with international market.</p> <p>Co-benefits: Key role in national food security and supporting indirect employment.</p>	<p>Job Creation and Labour Quality: Mix of large and small-scale producers with evolving labour demographics.</p> <p>Wages: Less variability in wages due to lower labour dependence.</p> <p>Conflicts/Trade-offs: Focus on local markets vs. labour and pesticide use issues.</p> <p>Co-benefits: Primarily oriented to local market. Supports local food security and dietary diversity, with growth potential in local markets.</p>
Territorial Balance	<p>Spatial Inequality: Seasonality leads to informal settlement growth and territorial inequalities.</p> <p>Community Impact: Shift to off-farm labour and Tenure Act repercussions cause housing issues, especially in smaller towns.</p> <p>Planning and Development: Efforts like the IDP face challenges in aligning community needs with institutional capacities and mandates.</p> <p>Land Dynamics and Trade-offs: Balancing increased land requests with the risk of land grabs.</p> <p>Co-benefits: Economic stimulation from supporting industries and indirect employment opportunities.</p>	<p>Planning and Development: Potential role in regional development.</p> <p>Potential tensions in integrating processing facilities with regional development plans.</p> <p>Investments in broiler industry can lead to improvement in rural infrastructure.</p> <p>Land Use Dynamics: Possible influence on land use in broiler production areas.</p> <p>Co-benefits: Potential indirect benefits to local economies and industries.</p> <p>Job creation in areas where employment may be scarce, reducing seasonal precarity.</p>	<p>Planning and Development: Potential role in local development, but sparse production units.</p> <p>Land Use Dynamics: Influence on land use patterns in areas of cultivation.</p> <p>Co-benefits: Possible positive impact on local markets, community development and food security.</p>

	Table Grapes	Broiler chicken	Pumpkin
Environmental Footprint	<p>Water Use: Heavy reliance on irrigation; significant strain on water resources.</p> <p>Water Management Challenges: Severe during droughts; farmers resort to drilling boreholes and building dams, adding pressure on water resources.</p> <p>Trade-offs: problems with issuing water licences and environmental law enforcement.</p> <p>Standards and Compliance: Efforts to meet environmental standards, but challenges in balancing these with economic viability and social standards.</p>	<p>Water Use: Less than for grapes, but still significant across VC for poultry production and processing.</p> <p>Environmental Impact: Concerns about landscape degradation and pollution.</p> <p>Trade-offs: Balancing rapid sector growth with environmental sustainability.</p> <p>Co-benefits: Least water-intensive source of animal protein, but needs better management of waste and water resources.</p>	<p>Water Use: Generally lower compared to table grapes, but increasing due to diversification.</p> <p>Resource Management: Need for sustainable practices in light of changing agricultural patterns.</p> <p>Trade-offs: Production expansion vs. environmental sustainability.</p> <p>Co-benefits: Importance for food and nutritional security and resilience confirmed during Covid pandemic crisis.</p>

Source: Authors' Elaboration.

Our interviews with various stakeholders in BVM mention several risks for the agricultural sector regarding climate variability. These are summarized below. The region is struggling to cope with increased rainfall variability and intensity. This situation directly impacts farming practices and has broader socio-economic challenges:

1. Increased Rainfall Variability and Intensity:

Interviewees noted a significant shift in rainfall patterns. In some areas, much higher-than-average rainfall has caused vineyard floods, while other areas face reduced rainfall. The type of rainfall has also changed, shifting from prolonged, gentle rains to intense, flood-inducing downpours. These changes have significantly affected farming practices, particularly in viticulture and fresh produce cultivation.

2. Impact on Agricultural Production: Farmers have seen alterations in weather patterns over the last few years, which are a challenge to crop production. The unpredictable nature of these changes, whether they are temporary anomalies or long-term patterns, has made planning and adaptation difficult. The variability in rainfall, particularly during the harvest season, has had a direct impact on the yield and quality of produce, including wine grapes and pumpkins.

3. Water Scarcity and Management: South Africa's status as a water-scarce country has worsened. This is due to a combination of a prevailing drought conditions post-1981, population growth and urbanization (Johnson & Mehrvar, 2021). Interviewees discussed the importance of efficient water management, including the use of greywater systems and the maintenance of river

systems for irrigation. The increasing frequency of thunderstorm-type rains and the occurrence of major flood events during typically dry months have further complicated water management, particularly for the wine and fruit industries.

4. Broader Socio-Economic Impacts: The effects of climate change are not limited to agricultural production. They also have broader socio-economic repercussions, for example, they may affect employment, health and local economies. Environmental changes exacerbate issues, such as water scarcity and inadequate sanitation in farming towns. These challenges are compounded by the need to balance high-demand export agriculture with the water and sanitation needs of growing local populations.

The response to the changing environment includes agricultural adaptation and community-focused resilience-building initiatives (see below). **In the BVM, stakeholders acknowledge climate change, but often relegate it to a lower priority than other urgent issues.** This situation illustrates the broader challenge of tackling climate change, especially in regions where socio-economic and infrastructural concerns require immediate attention. As explained by an interviewee:

"There [have] been a lot of meetings about climate change and the farmers are talking about it. It's definitely on the agenda. But if I'm very honest, the electricity crisis that we're facing now is a massive issue. (...) So, that is now the main priority and people looking at alternative energy sources. So, definitely, I would say that climate change goes on the back burner because the issues that farmers are facing now it's just overwhelmingly... there is market access and issues at the Cape Town port... So in terms of

issues that come before climate change, there's maybe a handful of them and I'm not talking about just a few."⁶⁰

The BVM food system faces a multitude of constraints, which significantly undermine its functionality and sustainability. These challenges encompass critical infrastructural deficits to socio-economic issues. One interviewee puts it very succinctly, stating, "South Africa is a constraint to us."⁶¹ Prior to climate change, the main constraints reported by interviewees include the ongoing electricity crisis and the increasing cost of inputs, coupled with widespread security concerns (see below). The interviews also discussed issues affecting smallholder farmers and residents of informal settlements, although these points are expressed less directly.

Some of the pressing constraints highlighted by farmers and their representatives in interviews include:

1. Electricity Crisis and Load Shedding: South Africa's electricity crisis, intensifying since 2007, affects numerous sectors due to factors like aging infrastructure, underinvestment in power plants, and maintenance challenges in existing stations. Eskom's operational and financial issues have caused shortfalls in electricity generation. Scheduled power outages, known as load shedding, have been implemented as a result. This poses significant risks to different sectors, such as fruit cooling and poultry processing, which require a consistent power supply to ensure storage and production continuity. Load shedding can cause substantial losses and operational disruptions.

2. Financial Constraints and High Input Costs: Farmers are under increasing financial pressure from rising agricultural input costs, including packing materials, which reduce profit margins. Smallholder farmers are especially affected because of their limited access to capital and credit. The need to modernize and adapt farming practices requires significant investments, which many farmers especially smallholders, struggle to afford. The financial challenges contribute to a shift towards consolidation in agriculture. Farmland is concentrated into larger holdings and farming practices tend to be less diverse, which undermines the agricultural resilience in the region.

3. Security and Crime Concerns: In the BVM's rural areas, security issues pose significant challenges. These are exacerbated by infrastructural deficits, such as unreliable electricity and network connectivity. An inconsistent power supply not only

disrupts farming operations, but also compromises the safety of residents and workers. Security issues impact the region's economic stability and social cohesion, deterring investment in agriculture, hindering community development and worsening social inequalities.

>>> 5.3 FOSTERING RESILIENCE TO PERCEIVED RISKS

The literature outlines the principles, policies, strategies and characteristics that can help enhance food system resilience. Bajželj (2020) proposes making a distinction between interventions, support conditions/principles, objectives and outcomes to simplify analysis. This subsection is organized around key principles that support resilience: **diversity/redundancy, connectivity and adaptability**. We discuss the interventions in BVM, which are aligned with these principles, and indicate potential trade-offs and interrelations. Our goal is to offer a comprehensive overview of food system resilience in relation to these three principles. We also consider the tension between short-term responses and long-term resilience strategies (Theron *et al.*, 2023).

Diversification Strategies in the Table Grape Industry, but Detrimental Effects on Water Use and Capital Concentration

Diversification is crucial for the resilience of food systems as it enhances their ability to withstand climatic and economic challenges. Diversification involves multiple strategies across the supply chains at various organizational levels. In agriculture, diversifying crops and farming practices builds resilience against climate change and ecological impacts. Similarly, income diversification, through risk management, safety nets and labour market strategies (including rural-urban migration), is essential for household well-being and food security. Additionally, robust market and trade systems can alleviate the impact of widespread weather events on food availability. In the processing sector, flexibility includes the ability to re-organize production/processing in response to a shock; obtain raw foods from other sources in the event of a disruption to existing supplies; tap alternative distribution channels (Aboah *et al.*, 2018; Hertel *et al.*, 2021).

However, enhancing resilience involves a complex balance. Increased production risks may prompt farmers to diversify, while greater market integration often leads to more specialized production. The complex interaction between diversification in

60. Interview, commercial farmers' representative, May 2023.

61. Interview, commercial farmer, BVM 2023.

production, diets and markets requires careful examination (Hertel *et al.*, 2021).

Diversifying grape production and varieties: In the Western Cape, larger producers in the table grape industry, for example, ASV Farms, manage multiple units in different regions, such as the Olifants River, Berg River and Hex River. This strategic diversification mitigates the impact of regional disruptions and allows for a more flexible response to retail demands. Extending the production season across several regions enhances the overall operational resilience. This approach is crucial for maintaining a steady supply chain and meeting market requirements. However, according to interviews, smaller producers struggle to deal with the risks and the increasing challenges.

The introduction of novel varieties like Cotton Candy™, Julep™, Bebop™ and Kokomo™ has also diversified the market. Producers are catering for evolving consumer tastes and demands, by supplying unique flavours and seedless grapes. They are also responding to environmental and social sustainability criteria (Aguilheiro-Santos *et al.*, 2022; Petrescu *et al.*, 2019). Growing different varieties with different growth cycles can extend the production season and mitigate agricultural risks, since different varieties have varying levels of resilience to climate changes, as well as different levels of resistance to pests and diseases. Grape companies, including Grapa Varieties, have invested in breeding low-chilling grape varieties adapted to rain and drought conditions. This strategy involves education and training for agricultural workers, including pruning, nursery harvesting and replanting courses. The VinPro Gen-Z project emphasizes sustainability standards in the wine industry. It focuses on worker education and sustainable agricultural practices. By working in partnership with seed companies and irrigation experts, the project aims to demonstrate and integrate sustainable practices across the industry.

Diversifying with citrus despite the challenges of water regulation: As mentioned above, the grape and wine industry has been faced with numerous challenges in recent years. This has prompted a search for alternative income sources. Four key trends have been identified: i) a reduction in the area under wine grape vineyards, ii) an increase in alternative crops, iii) a stagnation in the average wine grape prices, and iv) the impact of the drought in the Western Cape from 2015 to 2017. As a result, wine grape farmers in the Robertson area have increasingly diversified into citrus farming. Companies, such as EXSA, initially focused on

managing South African grapes in Europe. It has since expanded its portfolio to include other products, for example, citrus, stone fruit and melons. However, the shift to citrus comes with significant water challenges because citrus requires substantially more water than wine grapes. Furthermore, maintenance of the Brandvlei Dam Scheme has limited farmers' access to water during the citrus irrigation season (Bezuidenhout, 2020). The DWS has undertaken rehabilitation work to strengthen the dam's structural integrity.

Water access is increasingly limited in the agricultural sector, as discussed in section 3.1. Diversifying water sources, by combining river, groundwater, scheme water and on-farm storage, is one approach. This strategy is particularly important during droughts. It also serves as an "insurance policy" against the failure of single sources and is aligned with environmental upgrading. Yet, it also presents key challenges in terms of water regulation (DWS, 2016). Alternative adaptation strategies, such as improving water use efficiency and conservation, are also crucial for managing water scarcity in grape production, as detailed below.

Diversifying national and international markets:

The table grape industry predominantly depends on a few international markets, especially Europe and the UK. This is due to historical trade ties, market access and the preference for South African grapes in these regions. However, there is a notable shift towards diversifying export markets. For example, SATI is increasingly targeting markets in Canada, China, the Middle East, Southeast Asia and the US, as discussed in Section 4. Partnerships between SATI and the Western Cape Department of Agriculture are also being leveraged to enhance exports, with specific campaigns in markets like China.

A recurrent theme is the difficulty of accessing markets and the role of government support to facilitate access. An interviewee from the private sector described the government's failure to open up markets and negotiate import tariffs,⁶² particularly in the case of expanding into the US market. The problem is compounded by high import tariffs, which render certain markets inaccessible. Diversifying table grape end markets is also a response to the volatility linked to export market preferences. Several table grape varieties that South Africa used to export will now be sold on the local market or processed into raisins, an option that has become more attractive in recent years (Fresh Plaza, 2022).

62. Interview, commercial farmer, BVM April 2023.

Emerging Yet Limited Progress in Connecting Territories Food Supply Activities and Value Chains

Connectivity in food systems includes rural-urban linkages, trade, supply chain communication, inter-value chain interactions and various ecosystem services. It may also involve different aspects of the circular economy and food waste management. However, high connectivity has some drawbacks, for example, it can accelerate disease spread and other disturbances (Bajželj *et al.*, 2020).

Rural-urban connectivity is seen as a way to bolster food system resilience. Distinguishing between urban and rural areas is complex, as highlighted by Berkhout *et al.* (2023) and the literature review in section 2.3. Maredia *et al.* (2022) suggest that while connectivity can cause shocks to spread, it can also absorb shocks. The BVM has a blend of urban and rural characteristics. It includes towns like Worcester, De Doorns and Rawsonville, as well as smaller towns and rural areas, reflecting the region's strong agricultural heritage. The production of table grapes, vegetables and poultry is driven by urban demand and prices. The agricultural production supports the local economies and influences food security in both rural and urban areas. Urban centres benefit from diverse fresh food, often sold at informal street markets.

Value chain integration involves indirect interactions between various components, including inputs, services, producers' associations and brokers. In the BVM region, our observations suggest that the synergies across different value chains are limited. Some complementarity was reported between the table grape and citrus value chains in terms of labour, despite potential conflicts regarding pest management, land use and water consumption. There are also interactions between table grapes and pumpkins, as some producers cultivate both crops.⁶³ There are few interactions between table grapes and poultry. They primarily concern labour dynamics and potential input recycling, including: the use of chicken manure as an alternative to chemical fertilizers; or waste-to-value biomass converters, like those operated by RCL Foods (Cobban and Visser, 2017).

Further research is necessary to fully understand these interactions and their multifaceted impacts on the function and outcomes of value chains. There is potential to enhance resilience by developing sustainable activities linking poultry, table grapes, pumpkins and other value chains. For example, food

waste could be used to provide protein for livestock feed and indigenous crops could be used to make alternative poultry feed (Cobban & Visser, 2019).

Private sector responses to the vulnerability of logistics networks: The flow of goods in the food system heavily relies on adequate infrastructure. This includes roads, storage facilities and market access points. Inadequate infrastructure has a serious impact on the BVM food system. This is particularly flagrant when it comes to the transport and handling of perishable goods, such as table grapes and vegetables, at the Port of Cape Town and urban food markets. To mitigate these challenges, the private sector, including grape producers, is exploring alternative transport routes, private logistic solutions and product diversification.⁶⁴ For instance, in 2021, the table grape industry faced operational delays in ports and global shortages of containers, which impacted logistics and market schedules. The sector responded by producing higher volumes in most regions to meet market demands. Efforts by SATI to develop export markets and manage shipping disruptions is a further example of the supply chain's recovery and organizational capacity.

The Agricultural Hub Project is a potential solution to centralize resources and improve market access. However, private actors are sceptical about the project: *"These initiatives are not effective. If it is not privately-driven [it] is not effective or cost-effective (...) look at our ports, look at transnet, look at so many initiatives... They actually put additional constraints on us because we have to use them [once it is launched by government]"*.⁶⁵ Hence, the importance of managing and coordinating planning in and across these value chains is highlighted.

High Carbon emissions, a response to load shedding: In the BVM, the repercussions of load shedding are felt acutely in the agricultural sector and also among residents of informal settlements. For commercial farms, the erratic power supply disrupts critical processes, such as irrigation scheduling. Many farmers resort to diesel generators as an alternative. While this may solve the immediate problem of power outages, it represents a huge financial cost and increases carbon emissions. Smallholder farmers with limited resources cannot afford to use alternative sources of power, like diesel generators. This makes them vulnerable to interruptions in essential agricultural activities. Similarly, residents in informal settlements struggle to carry out basic daily activities during power outages. The limited access to alternative power sources exacerbates problems of food preservation and security.

63. Interview, pumpkin grower, BVM April 2023.

64. Interview, commercial farmers' representative, BVM May 2023.

65. Interview, commercial farmers' representative, BVM April 2023.

Reducing food waste is crucial for long-term resilience, though it may entail short-term trade-offs. For instance, efforts to increase efficiency and reduce waste may conflict with functional redundancy. Current food supply chains are often inflexible with regard to efficiency, particularly the specialized chains (Bajželj *et al.*, 2020). Initiatives to reduce waste are emerging in the table grape value chain. One notable example is the EXSA group's decision to adopt compostable inner packaging for exported grapes, in partnership with Superior Packaging, a South African company. This initiative represents a significant step towards the use of sustainable packaging practices in the industry.⁶⁶

A broader initiative to reduce food waste and enhance food security in South Africa is led by Food Forward SA, the country's largest food distribution company. Their food banking initiative involves sourcing, collecting and storing surplus edible food at various points in the supply chain. They focus on nutritious food and liaise with farmers, manufacturers and retailers. The food is then redistributed to a network of carefully selected beneficiary organizations across the nation. In 2022/2023, Food Forward SA distributed 88 million meals, reaching 985,000 people daily through 2,750 beneficiary organizations, with coverage extending to the Western Cape Province.

Integrating Adaptability into Planning

Adaptability refers to the relative ability of making changes. For example, it could be the capacity to modify food production and procurement methods in order to transform food system outcomes. Farmers could grow different crops, adopt technical innovations and relocate. Given the rapid pace of climate change and shifting weather patterns, transformational adaptation is often necessary. This is not simply a matter of incremental adaptation to emerging signals. It is a fundamental proactive shift in practices, distribution patterns and locations (Tendall *et al.*, 2015). This type of adaptation involves concrete actions by food system stakeholders at different scales.

In the context of the BVM, different strategies have been developed to adapt to climate change and other risks to the food system. These include initiatives at the on-farm, value-chain and territorial levels. They are closely linked with broader social actions, particularly in food support. The different initiatives identified in interviews and studies demonstrate a wide-ranging response to the challenges. They engage numerous stakeholders, including government agencies, non-

profit organizations and agricultural associations. There is a focus on community involvement, especially in activities like food gardening and conservation, which highlights the importance of a grassroots approach to building resilience.

Innovative strategies of on-farm water and soil management have been implemented to enhance sustainability. The LandCare initiative focuses on alien clearing and biodiversity conservation, promoting an ecological balance and sustainable natural resource use.⁶⁷ The wine producers' association, VinPro, has organized cover crop demonstrations to improve water efficiency and soil health.⁶⁸ WWF South Africa is working in partnership with M&S and Woolworths to implement water stewardship projects in the Western Cape's fruit sector, which has been identified as high risk. Fruit farmers in the Breede catchment have adopted water stewardship practices at farm level. WWF also supports farmers across the Western Cape in land use planning, production enhancement and responsible farming. It has developed best practices and agroecology training for smallholder farmers, within Participatory Guarantee Systems and extension services.

In terms of water efficiency, grape producers have significantly improved irrigation methods. They have adopted sophisticated systems, such as automated micro-jets or drip irrigation, combined with computerized soil moisture measurements. These systems optimize water use, by minimizing loss during water transport and application (Hex Valley Association). With these technological advances, applications can be controlled and monitored precisely. This is vital for meeting the quality standards of export markets and complying with sustainability certification, such as Global G.A.P. Jarman (2020) describes a strategic phase for reducing the water footprint in the Hex River Valley, emphasizing the importance of these initiatives in sustainable agriculture.

At the value chain level, adhering to sustainability standards is essential for aligning with international environmental and social norms. Companies, such as 'Growers by Nature', have incorporated comprehensive sustainability programmes into their operations (GBN website, 2023). A further example is the development of the Sustainable Initiative of South Africa (SIZA) standard, a membership-based platform for monitoring environmental sustainability and compliance with labour legislation. The standard meets global expectations for responsible production and supply chain transparency, providing

66. EXSA website: <https://exsa.com/>, retrieved Dec. 28 2022.

67. Interview, WCDoA representative, April 2023.

68. Interview, wine sector representative, BVM April 2023.

internationally recognized audits and certification. However, members of SIZA have to pay compliance costs and dedicate time and resources to documentation. Balancing the demands of SIZA with commercial pressures, as well as dealing with labour conflicts in the agricultural sector can be challenging.

Territorial Planning Strategies are also evident in BVM. The involvement of provincial and local governments in land use planning is crucial for addressing climate change and sustainable agricultural development. The LandCare Programme has promoted the strategic use of land resources, which is key to adapting to environmental changes (see Section 3.1). At the municipal level, the BVM Integrated Development Plan (IDP) incorporates climate change considerations. According to interviewees, the IDP, under the Municipal Systems Act, requires a dynamic approach, combining long-term forecasts with immediate feedback from stakeholders, including local communities, management, as well as provincial and national governments. The regular updates to the IDP, especially after council elections, are critical to maintain its relevance and adaptability. The last update was in 2021/2022. This process strikes a balance between planning for future challenges and addressing current local needs.

However, interviews also reveal a decentralized approach to climate change within the municipality, indicating areas for improvement in strategic planning. Departments, such as the fire and water services have specific climate-related responsibilities. They have to adapt to changing fire and rainfall patterns for community safety and water security. Yet, the municipality's approach to climate change may lack sufficiently detailed actions, key performance indicators and accountability measures. This highlights the need for a more integrated and action-oriented strategy in municipal planning.

In the BVM, various punctual emergency-led initiatives complement the long-term planning strategies. Local government and NGOs run food gardening projects to boost local food production and security. These include creating community and household gardens and promoting sustainable farming in residential areas. CASIDRA emphasizes backyard gardens and community projects, encouraging small-scale agriculture among residents. Similarly, initiatives by the Grow Great NGO focus on food gardening for mothers, promoting self-reliance and nutritional awareness in families. Many other national and local NGOs operate in the

BVM. For instance, The Do More Foundation, funded by RCL Foods, supports the Grow Great initiative at both strategic and local implementation levels in Worcester.

However, implementing these initiatives can be challenging due to: limited resources and funding; logistical difficulties to coordinate various stakeholders; the need for ongoing training and support to ensure sustainability. In addition, the effectiveness of these food gardening projects depends on environmental factors, such as water and land access, as well as soil quality. Lastly, gardens require labour throughout the year, which may be incompatible with the region's agricultural seasonality.⁶⁹

In addition, CASIDRA's disaster management initiatives provide essential relief to vulnerable populations. They play a key role in enhancing community resilience against natural disasters, such as floods and their impact on agriculture. For instance, CASIDRA has implemented over 200 projects in the Western Cape Province, in partnership with the Department of Agriculture and other public and private institutions. It launched a sub-programme on poverty and disaster response to help vulnerable households and communities produce their own food and to provide rural infrastructure and disaster support.⁷⁰ These initiatives include educating communities about the use of recycled water and crop protection against climate variability. Food Forward SA complements this by distributing food parcels and running the Mobile Rural Depot Programme. It focuses on delivering food to rural areas, especially to vulnerable groups, like mothers and children.⁷¹ Community-based initiatives, such as Early Childhood Development Centres and Soup Kitchens, which work alongside community gardens, illustrate the synergy between food production and distribution. They address immediate food security needs and foster community engagement and resilience. In addition, the rural clinic affiliated to Stellenbosch University prioritizes health and nutrition education. It offers practical training for healthcare students and conducts community outreach, with a focus on patient care and collaborative health practices.⁷²

The private sector is also engaged in social and food aid actions. These involve table grape growers and export companies, in particular, through corporate responsibility projects. For example, the company EXSA established Repelsteeltjie, a day-care centre in De Doorns, which provides care for over 100 children aged 2-6 years on weekdays. The centre cares for

69. Interview, Municipal body representative, BVM April 2023.

70. Interview, Casidra representative, BVM April 2023.

71. Interview, Food Forward representative, Cape Town April 2023.

72. Interview, Rural Clinic representative, BVM April 2023.

farm labourers' children and those from previously disadvantaged communities. It provides supervision, stimulation, as well as daily breakfast and lunch.⁷³ Similarly, 'Growers by Nature,' a marketing and export company specializing in table grapes and citrus in the Hex River area, develops social responsibility programmes with local communities. RCL Foods, through its 'Do More Foundation,' works in partnership with the Breede Valley Young Child Forum and ECD (Early Childhood Development) centres. This is part of a collaborative initiative established by the Foundation in 2019, which aims to co-create an environment in Worcester that is conducive to healthy early childhood development (RLC 2021).

Strengthening Resilience Through Collective Action

Losch and May (2023) explore the resilience of the Western Cape's food system during the COVID-19 pandemic, examining it from a collaborative governance perspective. The study highlights the shift from South Africa's state-led National Food and Nutrition Security Plan (NFNSP) of 2017 to more community-driven responses, which emerged during the pandemic in 2020–2021. It focuses on the development and role of Community Action Networks (CANs). The authors describe the Western Cape Government's food security strategy, 'Nourish to Flourish'. The strategy was designed to address a broad spectrum of food system outcomes, with a particular focus on food and nutrition security. It included various interventions, for example: food and nutrition literacy programmes; economic and spatial planning sensitive to food needs; the promotion of a climate-resilient agricultural sector; and support for informal food traders (WCG, 2016). The involvement of local governments, the collaboration with the Cape Higher Education Consortium (CHEC), and the establishment of the Southern African Food Lab (SAFL) for stakeholder engagement were key steps in this direction (Adelle *et al.*, 2020).

The article discusses the impact of the 2017/18 drought and the national lockdown in March 2020 due to COVID-19, which severely affected the food system. For example, the National School Nutrition Programme was suspended and restrictions were imposed on informal food traders. In response, the Western Cape saw a surge in community-led initiatives and networks that facilitated localized food debates and actions. School feeding continued with the involvement of organizations, such as the Peninsula School Feeding Association. 'Cape Town Together' was formed, linking nearly 200 organizations. These networks used digital platforms for coordination. This illustrates the role of civil society in tackling the immediate crisis and advocating for long-term changes in food system governance.

Losch and May (2023) emphasize that these interventions demonstrate the potential for developing polycentric forms of system governance, involving dialogue between various stakeholders at different levels. They argue that these local actions have paved the way for a possible collaborative governance model in the food system. However, they note that transformative change of this order could have both individual and collective costs. Thus, they underline the need for careful management and fair distribution of costs and benefits. The importance of agency and collaborative governance is highlighted, with emphasis on the need to expand beyond community action networks in order to enhance food system resilience. They suggest taking on different challenges, such as: funding shortages; leveraging local government mandates and tools; blending state-led and community-driven strategies; fostering innovation in governance. These elements, particularly territorially-based networks, have also been underlined in other studies, for example, Milhorange *et al.* (2022) and Zollet *et al.* (2021).

73. EXSA website <https://www.youtube.com/watch?v=QPavVMITRgA>, retrieved Dec 28 2022.



6

Conclusion

The BVM food system is dynamic, yet marked by significant disparities. It is confronted with long-term environmental, social and economic challenges. The situation is exacerbated by the interplay between local production and broader market dynamics. Its agricultural production is abundant, reflecting its strategic location and natural resources. The BVM foodshed produces almost 70% of the food groups consumed in the area. However, the local food supply in Worcester, Rawsonville, De Doorns and Touws River is limited and the population relies on food sourced from external markets.

This report addressed the challenges that different population groups encounter regarding access to diverse and nutritious food. It highlighted the predominance of supermarkets in Worcester's food landscape, the variety of retailers and the widespread availability of processed foods. It underscored the tension between local and global market interactions, and the dependency on export revenue, which creates stress points in the food system. Thus, despite its agricultural richness, the BVM region is struggling to ensure food and nutritional security, particularly for its vulnerable communities. This paradox highlights the need for more integrated and regionally-focused food systems. It calls for policies and practices that do not merely target production, but prioritize the equitable distribution and accessibility of food across the region.

Furthermore, the study examined the resilience of the BVM food system, emphasizing its ability to maintain or improve outcomes in the face of shocks. This includes its capability to produce and supply nutritious, culturally relevant food. The study revealed that climate change is perceived as a secondary risk by key food system stakeholders, who tend to give priority to immediate socio-economic and infrastructural concerns. This situation mirrors a wider challenge faced by regions with urgent needs. The obstacles to resilience and sustainability are evident, not only at farm level, but across agricultural value chains and in interconnected sectors, such as water and manufacturing.

Several strategies for resilience have been explored, emphasizing various principles such as, including diversity, functional redundancy, connectivity, and adaptability. The strategies involve different actors, including farmers, investors, government bodies and NGOs, which demonstrates the collective nature of resilience in the food system. One key feature of the strategies is their focus on agency, despite structural constraints. This highlights the role of different actors in decision-making and action implementation and reveal inherent trade-offs in terms of resilience between different the food system's outcomes and between different strategies. To understand food system resilience, we need to consider the social

organization and the distribution of power among stakeholders because their resources and ideas may shape the outcomes. Our analysis shows that resilience in the food system is not merely a technical challenge, but a matter of political process and collective action.

While many initiatives face significant implementation challenges, some involve the private sector's immediate response to urgent risks. For example, the use of diesel generators in cooling facilities to overcome the problem of load shedding, which may prove counterproductive or maladaptive in the long term. This kind of strategy reflects a broader trend in the BVM food system's resilience approach, which is to prioritize immediate recovery, rather than adaptation or planning for alternative food system outcomes. This focus on rapid restoration after disturbances means that less consideration is given to proactively or reactively transitioning to different, potentially more sustainable food system models. Nonetheless, in such complex settings marked by growing social inequalities and climate uncertainties, fostering sustainable urban food systems requires a multidimensional and politically sensitive strategy rather than technical solutions, as well as a serious re-examination of governance constraints and implementation barriers.

A potential pathway for the BVM food system involves acknowledging the co-benefits and trade-offs of outcomes at the territorial level, along with its long-term adaptability. This includes embracing circular economy concepts, such as mobile chicken slaughtering facilities and alternative feed production. It is vital to differentiate between strategies that address immediate disruptions and those designed for long-term systemic shifts. However, the success of these approaches depends on developing comprehensive skills and institutional capabilities, which requires a reflexive effort to deeply understand the political and structural constraints hindering food system governance and transformation. Reflexivity must extend beyond planning and discussion phases to the actual implementation of policies and strategies, where entrenched practices and unequal structures often become most obstructive. This process can be supported by science-policy dialogues, such as those exemplified by the Food Learning Journeys in BVM. Further research is also required to improve our understanding of the complex policy landscape. This could contribute to the development of more effective food security strategies and just, sustainable food systems.

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