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Barriers to building productive capabilities: the case of smallholder vegetable farmers in South Africa

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CCRED-OXFAM Working Paper 2023/10

August 2023

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Abstract

Agriculture is widely considered an important sector for inclusive growth due to relatively low barriers to entry and accessibility of economic opportunities for smallholder farmers. In South Africa, the widespread participation of smallholder farmers in vegetable farming, in particular women points to opportunities for inclusion and growth through agriculture. However, the terms of inclusion and participation of smallholder vegetable farmers remain limited to low-value economic activities with limited potential for growth and scaling up. Drawing on the case of South Africa's vegetable farming, this study provides in-depth insights into the nature and magnitude of barriers faced by smallholder vegetable farmers. The study finds that despite entry, smallholder vegetable farmers continue to face numerous production and marketing challenges that hinder their profitability and ability to take advantage of commercial opportunities. Smallholder vegetable farmers struggle to access resources to invest in on-farm infrastructure, equipment and inputs to fully utilise their land and expand production. The growing impacts of climate change-related risks demand investments in on-farm infrastructure and access to inputs to ensure quality production and consistent supply. At the marketing level, smallholder vegetable farmers sell their produce in diverse local markets including through informal markets, local supermarkets, fresh produce markets (FPMs), and corporate clients. While there are challenges in accessing reliable and stable routes to markets in supermarkets and corporate clients, the main challenge for smallholder farmers across the different routes to market relates to low prices of fresh produce and high price fluctuations. The interrelated risks and challenges create a vicious cycle, which locks smallholder vegetable farmers into unprofitable and unsustainable farming activities. While there is a range of government support for smaller farmers, it is limited in scale and scope with limited impacts on the overall growth of their businesses.

Keywords: vegetable farming, smallholder farmers, barriers to entry

JEL codes: Q13



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1. Introduction

Agriculture is widely considered an important sector for inclusive growth due to relatively low barriers to entry and accessibility of economic opportunities for smallholder farmers. More than 80% of the world's farms operate on less than two hectares of land and the majority of these farms are operated by rural smallholder farmers (Lowder, Scoet and Ranney, 2016; Kamara, Conteh, Rhodes and Cooke, 2019). Although these farms account for only 12% of the world's farmland, they provide an estimated 80% of the food produced in Asia and in sub-Saharan Africa (Lowder, Scoet and Singh, 2014; Lowder, Scoet and Ranney, 2016). Despite the key role played by smallholder farmers in food production, they face a mix of interrelated risks and challenges, which limit the possible benefits that could accrue to them (Fan and Rue, 2020; Abraham and Pingali, 2020; Kamara, Conteh, Rhodes and Cooke, 2019). Food and agricultural production is increasingly becoming competitive and capital intensive. As such, the ability of smallholder farmers to adapt and to build stronger productive capabilities to improve the competitiveness of their agricultural commodities is critical to create and to capture value in these value chains.

Drawing on the case of South Africa's smallholder vegetable farming, this study provides in-depth insights into the nature and magnitude of barriers faced by smallholder vegetable farmers especially women producers in building productive capabilities required to gainfully participate in these value chains. Vegetable production constitutes a small share of arable land area, and the majority of the active smallholder vegetable farmers are women (Thamaga-Chitja, 2012; Thamaga-Chitja and Morojele, 2014; Chagomoka, Afari-Sefa and Pitoro, 2014; Senyolo, Wale and Ortmann, 2018; Ndlovu, Thamaga-Chitja and Ojo, 2021). Given the role played by women in these value chains, addressing gender disparities along with other factors that influence women's level of participation is key for value chain development (Ndlovu, Thamaga-Chitja and Ojo, 2021; Khumalo, 2014; Stoian et al., 2018). Large gender gaps in access to essential productive assets and opportunities limit development of agricultural value chains in Africa (Ndlovu, Thamaga-Chitja and Ojo, 2021; Njiraini and Ngigi, 2018).

The challenges faced by smallholder vegetable farmers are well documented in the literature. Smallholder vegetable farmers face various production and marketing constraints that hinder their profitability and ability to respond and take advantage of commercial opportunities (Baloyi, 2010; Fan and Rue, 2020). Key constraints at the production level include access to basic production equipment and infrastructure such as modern irrigation systems, access to agricultural inputs, and access to comprehensive agricultural support services (extension and technical services) (Baloyi, 2010; Ndlovu, Thamaga-Chitja and Ojo, 2021; Chagomoka, Afari-Sefa and Pitoro, 2014; Senyolo, Wale and Ortmann, 2018; Onyemauwa, 2010). These challenges contribute to smallholder farmers' poor quality of fresh produce, inconsistent supply and low volumes of production (Osano, 2010; Onyemauwa, 2010; Senyolo, Wale and Ortmann, 2018). At the core of smallholder farmers' production challenges is the limited access to credit and financial resources (Ndlovu, Thamaga-Chitja and Ojo, 2021; Boateng, Amfo, Abdul-Halim, and Yeboah, 2016).

At the marketing level, smallholder vegetable farmers have limited access to formal, high value markets especially supermarkets and wholesalers (Baloyi, 2020; Ndlovu, Thamaga-Chitja and Ojo, 2021; Senyolo, Wale and Ortmann, 2018). Supermarkets and wholesalers

have become important players in the South African food system especially with regard to sourcing of fresh fruit and vegetables. Their stringent sourcing criteria relating to volumes, quality, food safety, consistency and year-round supply increase the likelihood of excluding smallholder vegetable farmers from these routes to market (Louw, Jordaan, Ndanga and Kirsten, 2008; Baloyi, 2010). Most smallholder farmers therefore rely on informal markets to sell their produce. These markets are characterised by huge price fluctuations in a context where smallholders farmers generally have less bargaining power in setting prices of fresh produce (Ndlovu, Thamaga-Chitja and Ojo, 202; Senyolo, Wale and Ortmann, 2018; Onyemauwa, 2010; Chagomoka, Afari-Sefa and Pitoro, 2014; Will, 2008). This often results in them being price takers and receiving low market prices. Furthermore, the highly perishable nature of vegetables coupled with lack of cold chain and storage facilities mean that producers are at times compelled to sell their produce immediately after harvest, which leads to low farm gate prices (Boateng, Amfo, Abdul- Halim, and Yeboah, 2016).

Owing to the above and other challenges, participation of smallholder vegetable farmers remains limited to low value economic activities with limited opportunities for growth and scaling up. It is against this background that the study contributes towards identifying and deepening understanding around systemic barriers faced by smallholder vegetable farmers in South Africa. Drawing on fieldwork interviews with thirty-three different actors in the industry, the paper unpacks how issues of access to finance, key inputs, markets and information shape outcomes and opportunities for inclusion and building of stronger productive capabilities. Inclusion of smallholder farmers is particularly pertinent in South Africa due to longstanding challenges with racialised inequality and the systematic exclusion of black South African farmers from commercial agriculture under apartheid. The vegetables industry thus provides for an interesting case study to interrogate issues of inclusion and growth. The industry is characterized by relatively low barriers to entry and widespread participation of smallholder farmers especially women. Vegetables are economically more profitable than a range of crops including cereals and pulses. Therefore, they have the potential to be highly profitable, provide employment opportunities, and generate income necessary to bring about increased commercialisation of the sector (Chagomoka, Afari-Sefa and Pitoro, 2014).

This study forms part of a collaborative project that CCRED is undertaking with partners, The Graça Machel Trust, and the Women on Farms Project and it is funded by Oxfam South Africa. The project seeks to implement inclusive and gender transformative value chains, in particular those that empower women producers and return a fair share of value to rural communities.

While the paper initially sought to understand barriers to entry and growth faced by farming businesses owned by women entrepreneurs, it was difficult to isolate and systematically assess gender-specific aspects of entry and participation. This is despite conducting the majority of interviews with farming businesses owned by women entrepreneurs. Gender-specific issues were only raised anecdotally by interviewees (for instance, around cultural barriers to accessing land). Furthermore, the issues raised by women entrepreneurs were not different from those raised by male entrepreneurs. As such, the interviews provide crosscutting insights on entry and growth applicable to SMEs in general.

The study finds that despite entry, smallholder vegetable farmers continue to face numerous barriers to growth. While the majority of smallholder farmers interviewed have access to land and are involved in production of vegetables, they have major challenges with accessing resources to invest in on-farm infrastructure, equipment and inputs to fully utilise their land and expand production. The growing impacts of climate change related risks demand investments in on-farm infrastructure and access to inputs to ensure production of high-quality disease-free produce and consistent supply. At the marketing level, smallholder vegetable farmers sell their produce in diverse local markets including through informal markets, local supermarkets, fresh produce markets (FPMs), and corporate clients. While there are challenges in accessing reliable and stable routes to markets in supermarkets and corporate clients, the main challenge for smallholder farmers across the different routes to market relates to low prices of fresh produce and high price fluctuations. The interrelated risks and challenges create a vicious cycle, which locks smallholder vegetable farmers into unprofitable and unsustainable production activities. While there is a range of government support for smaller farmers, it is limited in scale and scope with limited impacts on the overall growth of their businesses.

The study is timely in that the Agriculture and Agro-processing Master Plan (AAMP) highlights the vegetables value chain as one in which interventions are necessary to increase the share of black ownership and contribution of small producers. The AAMP aims to increase the share of black ownership and contribution of small-scale vegetable producers from 1% of total output in 2019 to 20% in 2030; and expanding their area planted from 400 hectares to 11,000 hectares. Together with increased production, the AAMP aims to grow exports of vegetable producers into regional markets in the Southern African Development Community (SADC). The study provides valuable insights to inform Phase II of the AAMP which focuses on operationalisation of the negotiated commitments. The study also aims to contribute towards the ongoing Competition Commission's National Fresh Produce Market Inquiry examining whether there are any features in the fresh produce value chain, which lessen, prevent or distort the competitiveness of the South African fresh produce markets.

The paper addresses the following key research questions:

1. What are the key activities and barriers faced by smallholder vegetables farmers in South Africa?
2. How do the identified barriers limit growth of smallholder vegetable farmers and what capabilities are required to overcome these barriers?

The paper is structured as follows. Section 2 describes the methodology. Section 3 sets out the industry structure and assesses the performance of key indicators over time. Drawing from in-depth interviews with vegetables industry participants, Section 5 evaluates barriers to entry and growth in line with the research questions. Section 6 concludes, reflecting on insights from the extensive fieldwork and provides policy recommendations.

2. Methodology

The paper uses a combination of primary data from 33 interviews conducted for the Oxfam project in 2022 (project details provided in the Introduction section), and a review of secondary data and policy documents. The study adopted a mixed (quantitative and

qualitative) methods approach to assess entry and participation of SMEs. A mixed-methods approach means that qualitative and quantitative data can complement each other, allowing for effective triangulation of data. The quantitative analysis helps to establish whether changes in trends took place while qualitative information helps to understand the factors that may have influenced the changes in industry trends. Secondary quantitative data on key economic indicators including on production and national average prices from the Department of Agriculture, Land Reform and Rural Development (DALRRD) was used to provide an overview on industry performance and changes. Complementing secondary data, the study conducted interviews to gather qualitative information on several factors affecting participation of SMEs in the value chain. These included investments in infrastructure, production, markets, and industry support structures. Interviews were largely focused on the smallholder vegetable farmers and how they interact with different industry stakeholders (buyers and government). The paper also builds on insights from parallel papers developed as part of the Oxfam project by CCRED. These include two reports on barriers to entry, and women economic empowerment providing important context to analyse issues of inclusion and participation in the vegetables value chain.

a. Criteria for selection of interviewees

A combination of initial key informant primary interviews and desktop review was used to map key players and activities in the value chain. This informed the purposive sampling of firms for interviews (see Table 1 list of interviewees). The focus of the project is on small and medium-sized farming businesses. These are largely black growers while the established commercial farmers are the white growers. To understand dynamics across the whole value chain from inputs to markets, we interviewed representatives at different levels along the value chain. These included input suppliers, vegetable farmers, researchers, industry bodies and government departments in agriculture.

b. Design of interviews: Topics covered

Data was collected through semi-structured, in-depth interviews, with interview guides centering on the following themes:

- i. Access to land, on-farm investments, and production activities
- ii. Markets and competition
- iii. Role of industry networks/associations
- iv. Support from government and other institutions
- v. Challenges faced by farmers and industry as a whole

c. Composition of interviewees and geographical spread

The interviewees comprised farmers, input suppliers (seeds and seedlings), the fresh produce importers association, researchers and the Department of Agriculture, Land Reform and Rural Development (DALRRD). Interviews were conducted in two vegetable-growing provinces of Gauteng and Limpopo (Table 1). Gauteng's proximity to key markets

means that farmers would want to acquire production land closer to markets. On the other hand, Limpopo constitutes an important horticulture growing area accounting for 14% of the total number of farming units in horticulture in 2017 (Statistics SA Census of Agriculture 2017).

At the farming level, we interviewed 29 entities. Of these, 16 farmers are located in Gauteng while 12 are located in Limpopo Province and the remainder is located in the Eastern Cape. 16 out of the 29 entities are women-owned businesses operated by a sole, female entrepreneur, while 8 entities are co-owned female and male businesses, and 5 are male-owned businesses (Table 1). These farmers comprise individual black farmers carrying out farming operations on land that they accessed through different means including private purchases using personal funds or bank loans, leasing from landowners, community property associations and municipalities, and those that have received land through the land reform programme. The majority of the interviews with farmers were with black farmers which provided information on entry, inclusion and growth into vegetable farming and access into key markets. The classification based on race is important in the context of South Africa where entry barriers and ownership are largely based on race.

Table 1: Composition of interviewees

Code	Date of interview	Province	Access to land	Ownership by gender	Total land (ha)	Area planted (ha)	No. of permanent farm workers
Vegetable farmers							
F01	10/08/2022	Gauteng	Owns land	F	6	1	9
F02	11/08/2022	Limpopo	Leasing	M	1.5	1.5	12
F03	18/08/2022	Gauteng	Leasing	F	1.2	Preparing land	2
F04	22/08/2022	Gauteng	Leasing	F	8.5	2.3	
F05	15/09/2022	Eastern Cape	Leasing	F/M	48	1	
F06	21/09/2022	Gauteng	Owns land	F	0.03	0.03	1
F07	28/09/2022	Gauteng	Owns land	F/M	5	5	3
F08	23/09/2022	Gauteng	No	F			
F09	17/10/2022	Gauteng	Leasing	F	14	6	4
F10	18/10/2022	Gauteng	Owns land	F/M	3.9	1	2
F11	30/07/2022	Gauteng	Leasing	F	2	1	5
F15	05/09/2022	Gauteng		F	21.5		
F16	07/11/2022	Gauteng	Owns land	F/M	8.5	7	5
F17	08/11/2022	Gauteng	Owns land	F/M	2.14	1.1	6
F18	08/11/2022	Gauteng	Owns land	F	2		
F19	09/11/2022	Gauteng	Leasing land	M	11		
F20	15/11/2022	Gauteng	Leasing government land	M			
F21	16/11/2022	Gauteng	Leasing government land	F	0.5		
F22	21/11/2022	Limpopo	Owns land	F/M	90	1.5	3
F23	21/11/2022	Limpopo	Owns land	F			

F24	21/11/2022	Limpopo	Owens Land	F/M	10	2	
F25	22/11/2022	Limpopo	Owens land	F/M	8	7.5	5
F26	22/11/2022	Limpopo	Owens land	M	8.9	3	4
F27	23/11/2022	Limpopo	Owens land	F	8.8	7	6
F28	23/11/2022	Limpopo	Family land	M	0.5	0.5	
F29	24/11/2022	Limpopo	Owens land	F	10	6	8
F30	24/11/2022	Limpopo	Owens land	F	79	26	
F31	24/11/2022	Limpopo	Owens land	F	3	3	2
F32	25/11/2022	Limpopo	Leasing communal land	F	100	10	20

Other industry stakeholders							
	Date of interview	Location	Organisation	Function			
F12	05/09/2022	Gauteng	Fresh Produce Importers Association	Vegetable importers organisation			
F13	25/08/2022	Gauteng	Livingseeds	Input supplier			
F14	14/06/2022	Gauteng	Academia	Researcher			
F33	25/11/2022	Gauteng	Department of Agriculture, Land Reform and Rural Development	Government			

Source: Authors' own compilation

d. Challenges faced in the research process

Interviews were conducted through physical face-to-face interviews and online/telephonic interviews. Face-to-face interviews were effective in terms of connecting with the interviewees and provided more space and time to probe issues further. However, putting together a database of small and medium-sized vegetable growers was difficult because although they are registered businesses, they do not have business websites. Furthermore, the industry does not have organised industry structures that collect and publish industry data. Researchers relied on farmers to provide contact details of neighbour farmers that they know or requested for contact details from informal networks of farmers. This was a key challenge particularly for black growers in the rural parts of the country in Limpopo.

The following section provides an overview of the industry performance and structure to provide context for the study and to understand the role of smallholder farmers in the value chain. Trends in performance are also important for identifying opportunities for upgrading into higher value economic activities in the value chain.

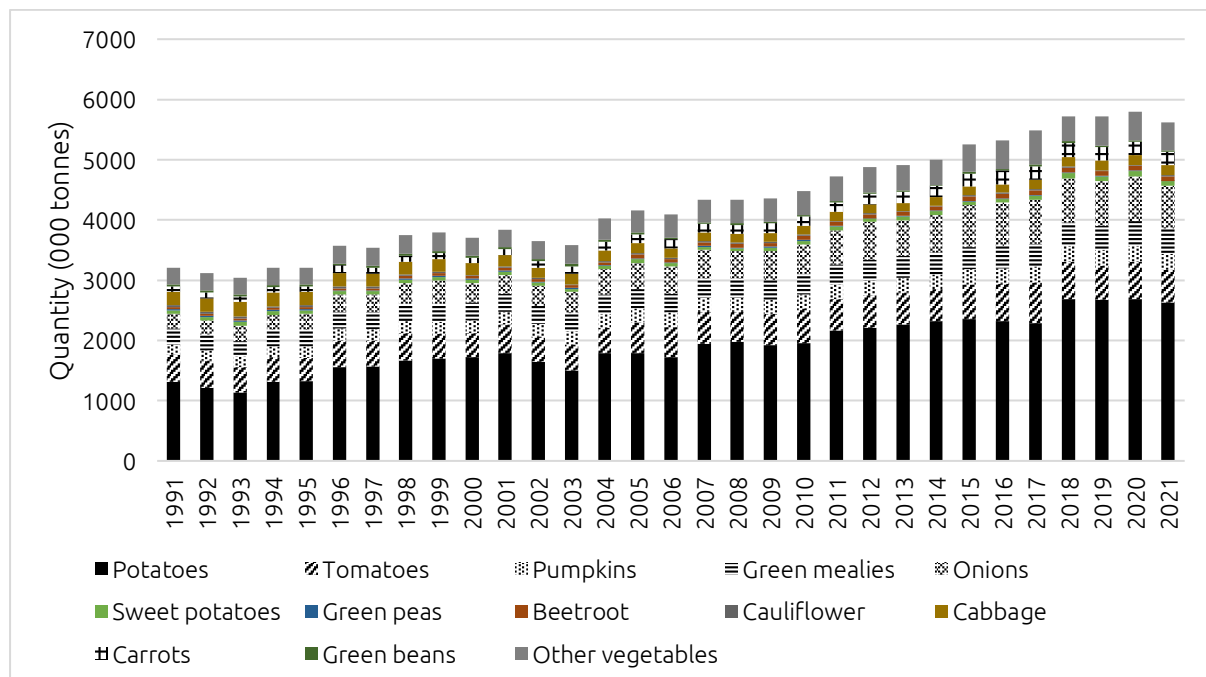
3. The vegetables value chain: Industry performance and structure

The vegetables industry constitutes an important sub-sector in South Africa's fast-growing horticulture industry within the broader agriculture sector. While the real gross value of production for vegetables has grown by 16% from R25billion in 2015 to R29billion in 2021, its share in horticulture has slightly decreased from 29% to 27% over the same period (DALRRD, 2022). However, vegetable production provides a promising economic opportunity for reducing rural poverty and unemployment. The production of vegetables is labour intensive and has the potential to improve incomes of the majority of smallholder and women producers participating in these activities.

Vegetables are produced in every province of the country. The area under vegetable production has increased marginally over the 10-year period between 2007 and 2017 from 107 680 hectares to 108 233 hectares in (Statistics South Africa, 2017). However, production of vegetables has increased faster by 30% from 4,3 million tonnes in 2007 to 5,6 million tonnes in 2021 (Figure 1). Vegetables constitute a key item in the consumer's food basket and the shifts towards healthy eating drive the steady growth in production of vegetables. The observed dip in production between 2002 and 2003 could be due to the 2002 – 2004 drought over the northern parts of the country, which recorded well below-average rainfall for at least the first four months of the summer period (October–January) (Reason and Phaladi, 2005). However, large scale vegetable production is generally carried out under intensive farming conditions using irrigation systems with limited impacts from droughts.

Vegetables that have recorded the fastest growth in production between 2007 and 2021 include carrots (51%), onions (50%), potatoes (37%) and beetroot (32%) while green peas, green beans and cauliflower have been declining in production.

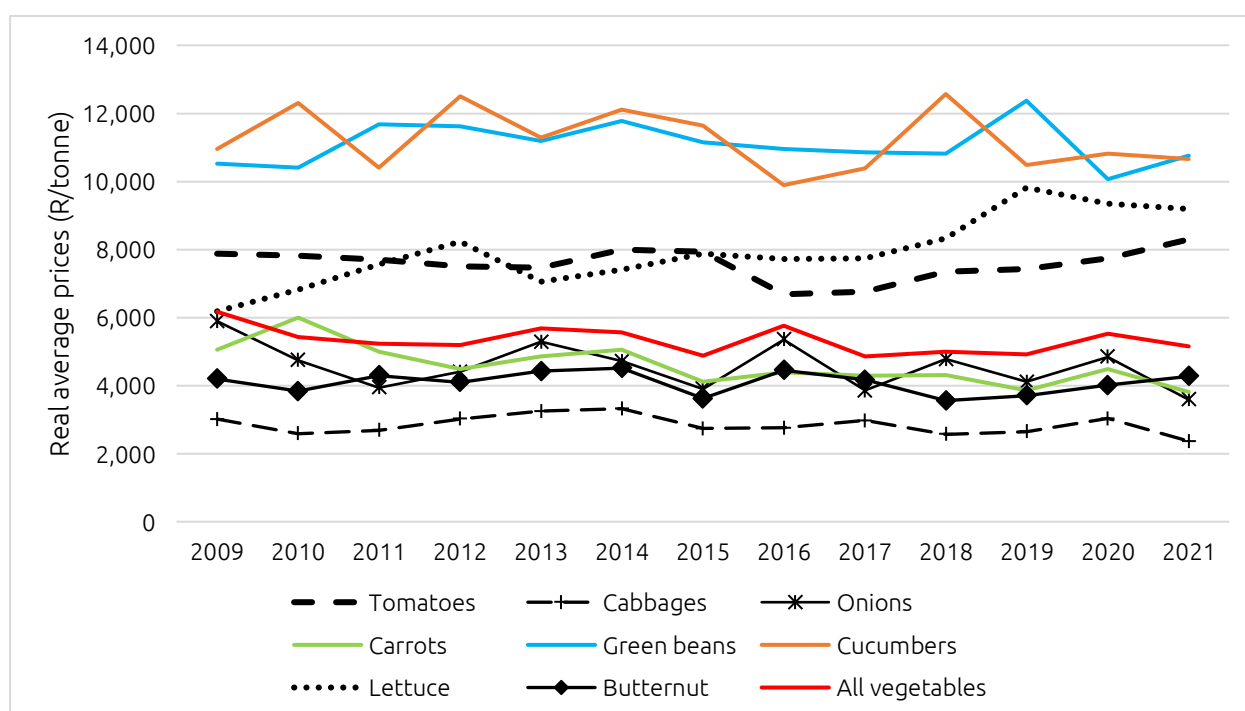
Figure 1: Vegetables production (tonnes), 1991-2021



Source: DALRRD Abstract (2022)

Vegetables are sold in domestic markets and the average prices of vegetables are determined by the interaction between supply and demand. While the production of vegetables has increased by 30% between 2007 and 2021, the real average price of all vegetables has seen a steady decline of 17% between 2009 and 2021 (Figure 2). Vegetables that have experienced the largest declines in real average prices are cabbages, onions and carrots. This has important implications for profitability of the majority of smallholder vegetable farmers who largely grow the same vegetables. On the other hand, cauliflower, beetroot, lettuce and tomatoes recorded the largest growths in real prices. Although these vegetables are considered more profitable than most vegetables, they are also expensive to grow. For example, tomatoes require significant levels of technical expertise and greater amounts of inputs (agro-chemicals and fertilisers) because they are susceptible to a wide range of diseases. Tomatoes also take a longer period to start harvesting compared to leafy vegetables (such as spinach and kale), which has cashflow implications. Tomatoes require on average twelve weeks to start harvesting while vegetables such as spinach can be harvested from as early as from four weeks. Hence, smallholder farmers tend to grow low value crops such as spinach, cabbages and carrots given that they are quick, easy and less expensive to grow in terms of input requirements and they have a ready market.

Figure 2: Real average prices of vegetables, 2009-2021¹



Source: Source: Department of Agriculture, Land Reform and Rural Development (DALRRD) Abstract, 2022. These are national real average prices adjusted for inflation using the CPI for vegetables for the total country. They were collected from sales on 19 major fresh produce markets from the year 2010, and 21 major fresh produce markets from the year 2015.

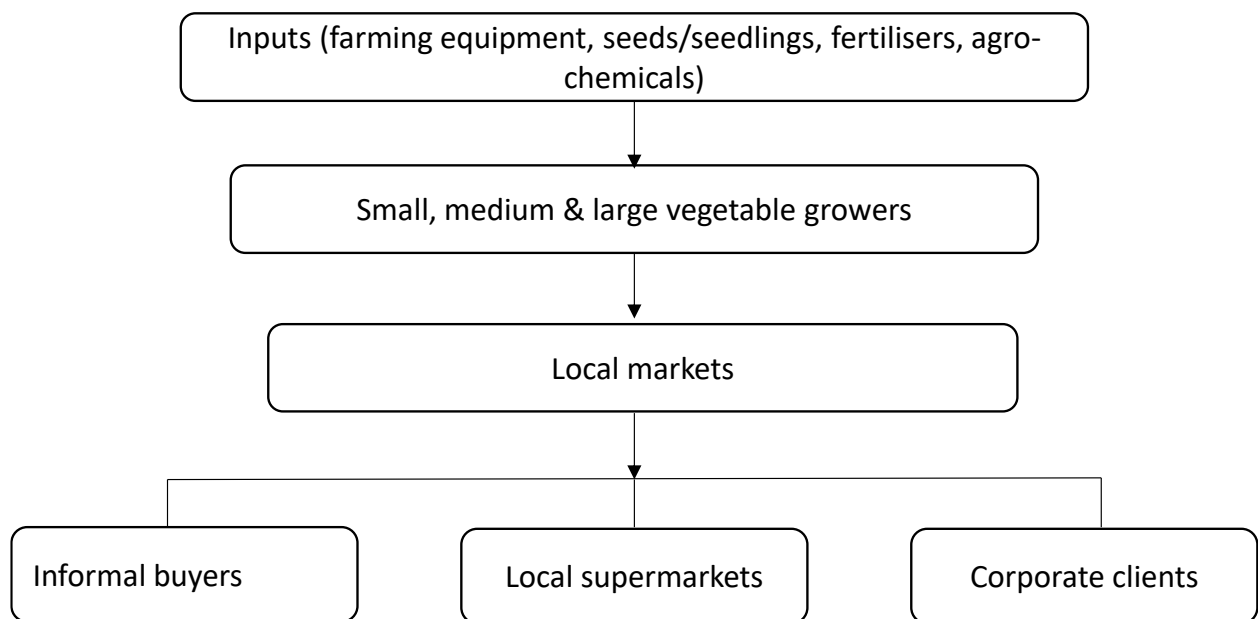
¹ The national average prices are current prices collected from sales on the 19 major fresh produce markets from the year 2010, and 21 major fresh produce markets from the year 2015.

Nonetheless, there are opportunities for smallholder farmers to leverage existing capabilities in production of vegetables such as spinach, carrots and cabbages to shift to producing higher value vegetables such as baby spinach, baby carrots, lettuce and cauliflower with improved economic returns. These higher value vegetables are also important for accessing reliable and stable routes to markets in supermarkets and the hospitality industry. However, realising these opportunities requires investments in standards certification, for example Global Good Agricultural Practices (GAP). Global GAP certification costs roughly R70,000 and takes six months to acquire.² Such certifications involve significant red tape and are administratively demanding in terms of the time required to put together the paperwork for auditing purposes. Apart from the direct expenses of acquiring the standard certification and paying for auditing bodies, smallholder farmers need to put in place the structures and systems for record keeping to ensure compliance.

a. Industry structure

The vegetables industry fits into a domestic value chain, with key markets in local production areas (Figure 3). It is a short chain, and this partly owes to the perishable nature of vegetables coupled with lack of industry investments in cold chain facilities.

Figure 3: Vegetables value chain in South Africa



Source: Authors' own compilation from interviews (2022)

The majority of interviews focused at the production level. The production of vegetables is characterised by a large number of dispersed and diversified smallholder farmers alongside large farmers. Of the smallholder farmers we interviewed, these grow leafy vegetables (spinach, kale, covo), tomatoes, cabbages, carrots, onions, lettuce, peppers, butternuts and Indian vegetables (chillies, aubergines, brinjal, okra, calabash). A single production cycle takes about three to four months, with the amount produced decreasing over time

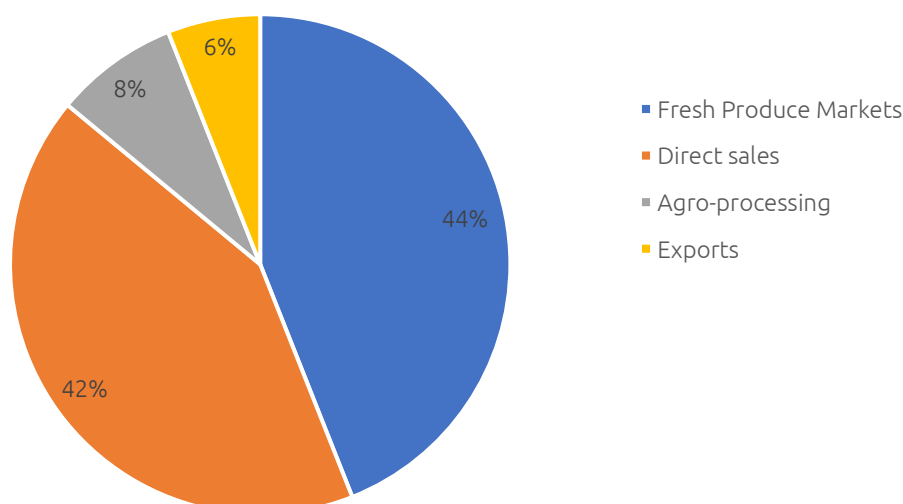
² Interviews with F17 on 08 November 2022, F27 on 23 November 2022, F32 on 25 November 2022.

(Senyolo, Wale and Ortmann, 2018). Although vegetables are labour intensive crops, the sample of our smallholder vegetable farmers are not employing as many farm workers in absolute terms. On average, vegetable farmers employ less than one worker per hectare which is relatively lower than the fruit industry, which employs just over 2 workers per hectare (Chisoro-Dube, das Nair, Nkhonjera, 2018).

After harvesting, smallholder farmers immediately send their fresh produce to the market due to lack of investments in cold chain and packhouse facilities. They sell their produce in local markets using several channels. Key markets are informal markets, local supermarkets, Fresh Produce Markets (FPMs), and corporate clients. Informal markets include individual customers, hawkers, vendors, small businesses and independent grocery stores, school nutrition programmes and clients who have contracts with retailers. Supermarkets largely comprise of Spar and Boxer Stores within local growing and residential areas. Corporate clients include hotels, restaurants, agro-processors, and large fresh produce companies.

Nationally, the main distribution channels for vegetables are FPMs and direct sales which account for 44% and 42% of national sales, respectively (Figure 4). Agro-processing and exports although important for value addition and higher economic returns account for negligible shares of 8% and 6%, respectively.

Figure 4: Distribution channels of vegetables (2020/21)



Source: Stats SA (2021)

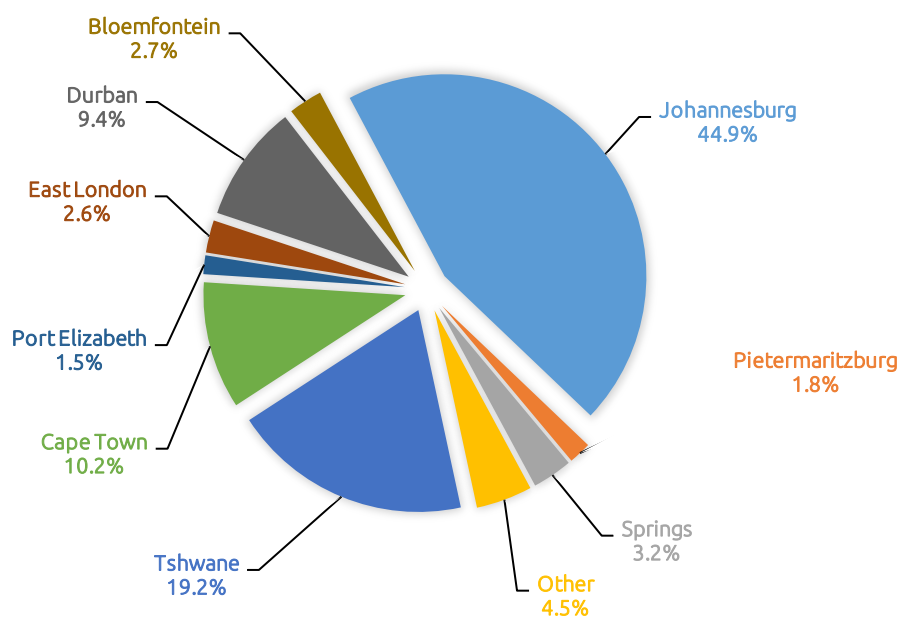
FPMs are municipal owned markets managed by local authorities. There are 18 fresh produce markets in the country. The Johannesburg market is by far the largest fresh produce market in the country with a market share of 45% based on turnover in 2021 (Figure 5). Tshwane is the second largest market with a turnover market share of 19% followed by the Cape Town and Durban markets with 10% and 9%, respectively in 2021.

FPMs operate on a commission basis. The requirements to supply FPMs include market management and agent fees, health and food safety requirements, and sorting, grading,

packing and labelling of fresh produce to ensure traceability (Louw and Jordaan, 2016). Although smallholder farmers wash and package their produce, they do not have the infrastructure to sort and grade their fresh produce, which is important to realise higher prices.

The main vegetables sold at FPMs in terms of quantities sold include potatoes, onions, tomatoes, cabbages, and carrots. The main buyers at fresh produce markets include hawkers, street vendors, supermarkets, distribution centres and processing plants within South Africa and across the Southern Africa region (Mozambique, Zimbabwe, and Zambia).

Figure 5: Market share of the major fresh produce markets according to 2021 turnover



Source: DALRRD (2021)

The above section has provided context in terms of the industry performance and the structure in which smallholder farmers operate and are embedded in. Furthermore, data on trends in production and prices of vegetables, coupled with key activities in the value chain provided some insights on opportunities for upgrading within the value chain. The following section discusses the interview findings in the context of the industry's performance to better understand challenges faced by smallholder farmers and the capabilities required to grow and be profitable.

4. Barriers to entry and growth for smallholder vegetable farmers

The production of vegetables is characterised by widespread entry and participation of dispersed and fragmented smallholder farmers especially women. Access to land is critical for entry into vegetable farming. While smallholder farmers in our sample have managed to access land through different means including private purchases, leasing from landowners, community property associations, municipalities, and government; access to land remains a

key structural barrier to entry for smallholder farmers in general. Often, smallholder farmers do not have personal savings or access to finance to purchase land and the bureaucratic processes of acquiring land through the land reform programme deters SMEs from pursuing this route. These challenges are more acute for women who face cultural barriers to accessing and owning land.³ Furthermore, without title deeds, women cannot access funding from financial institutions and government.

a. Access to inputs and on-farm infrastructure

While access to land is necessary, it is not sufficient. The majority of the interviewed smallholder farmers have access to land and are involved in production of vegetables. However, they have major challenges with access to resources to invest in on-farm infrastructure, equipment and inputs to fully utilise the land and expand production. Farming is a capital and resource intensive business. The ability to increase production and to supply consistently throughout the year requires investments in intensive farming practices. This entails investments in fencing, farming tools, tractors, boreholes and pumps, irrigation systems, shade nets, and greenhouse tunnels.

Table 1 shows that smallholder vegetable farmers generally tend to use small pieces of land for actual crop production (on average between 1 hectare and 7 hectares) although they are not all small in terms of the size of their farms. Some farmers have large tracts of farmland, but they are not planting the entire land. This shows that total farm area does not necessarily reflect full capacity utilization given the limitations that farmers face in terms of investing in infrastructure and inputs to expand production. For example, one farmer with an 8.5-hectare farm was planting on only 4 hectares of land, which were equipped with an irrigation system while the rest of the farm did not have irrigation and could only be used during the rainy season.⁴

A number of smallholder farmers are investing in irrigation systems, greenhouse tunnels and shade nets. However, in most cases the infrastructure is dilapidated and is not functioning properly, which means that crops take longer to grow and to harvest.⁵ Due to lack resources to purchase quality infrastructure and equipment including to pay for services of technical experts such as engineers, smallholder farmers install and set up on-farm infrastructure and systems by themselves, with implications on the quality and effectiveness of the infrastructure. Poorly installed irrigation systems require that smallholder farmers constantly incur the costs of fixing and repairing the equipment (for example, burst irrigation pipes or breakdowns in irrigation pumps), which makes farming operationally expensive.⁶ For example, one farmer with a 5-hectare farm indicated that the cost of installing an irrigation system on the entire farm and four 300m² greenhouse tunnels including labour was approximately R2.5million to R3million.⁷ These investments were made over a period of 3 years and the farming business is still not yet profitable. In addition, some

³ Interviews with Veg F05 on 15 September 2022, F09 on 17 October 2022.

⁴ Interview with F16 on 07 November 2022.

⁵ Interviews with F01 on 10 August 2022, F02 on 11 August 2022, F03 on 18 August 2022, F05 on 15 September 2022, F06 on 21 September 2022, F07 on 28 September 2022, F08 on 23 September 2022.

⁶ Interviews with F07 on 28 September 2022, F10 on 18 October 2022, F18 on 08 November 2022.

⁷ Interview with F07 on 28 September 2022.

key infrastructure inputs such as greenhouse plastics are imported from Israel and farmers claim there is only one company that sells and distributes this plastic in South Africa. The price of plastic for a 300m² greenhouse was claimed to be R9,000 in 2020 and has increased by 67% to R15,000 in 2022.⁸ Given the lengthy period it takes to become profitable, access to finance and working capital is critical to make these lump sum investments in infrastructure to produce sustainably.

The growing challenges of weather and climate change related risks such as strong winds, heavy rains/hailstorms, frost and heatwaves demand that farmers invest in on-farm infrastructure, particularly shade nets and greenhouses, to protect crops. Farmers have indicated several experiences when hailstorms destroyed their entire crop.⁹ The majority of smallholder farmers still practice open field farming incurring significant crop losses in cases of extreme weather conditions. Also, most vegetables do not grow well in winter due to frost or very low temperatures. Smallholder farmers therefore plant their crops in summer when the temperatures are warmer. The downside to waiting for warmer summer periods (from around September in South Africa) is that there is oversupply of fresh produce on the market, and the prices of fresh produce drop to very low levels which are not profitable. In these cases, on-farm infrastructure such as greenhouse tunnels and shade nets provide warm temperatures and a conducive environment to be able to grow different vegetables across all seasons including winter. This allows the farmer to earn higher prices in periods of low supply and to average out price fluctuations in fresh produce markets.¹⁰

Alongside infrastructure investments, sustainable production requires timely access to inputs to produce quality and disease-free produce with a longer shelf life. Farming is a time sensitive business, and it is easy for a farmer to lose an entire crop because they did not apply required fertiliser or agro-chemicals on time. However, the rising prices of farming inputs, which are also subject to price fluctuations in global markets and changes in exchange rates, raise the cost of farming.¹¹ For example, the price of one bag of soluble calcium ammonium nitrate used for tomatoes under greenhouses is claimed to have increased by 175% from R145 per 25kg in 2020 to R400 per 25kg bag in 2022 while the non-soluble fertiliser used in the open field increased by 123% from R325 per 25kg bag in 2020 to R725 per 25kg bag in 2022.¹² Increases in input costs are absorbed by the farmer, squeezing farmer margins given that they are not price setters and are typically unable to fully pass input cost increases to buyers in these highly competitive fresh produce markets. To save on input costs, some farmers are saving or banking seeds they purchase from seed companies and producing their own seedlings for planting.¹³

⁸ Interview with F07 on 28 September 2022.

⁹ Interviews with F25 on 22 November 2022, F26 on 22 November 2022.

¹⁰ Interviews with F02 on 11 August 2022, F07 on 28 September 2022, F10 on 18 October 2022, F13 on 25 August 2022, F16 on 07 November 2022.

¹¹ Interviews with F02 on 11 August 2022, F07 on 28 September 2022, F25 on 22 November 2022.

¹² Interviews with F07 on 28 September 2022.

¹³ Interviews with F04 on 22 September 2022, F07 on 28 September 2022, F13 on 25 August 2022, F19 on 09 November 2022.

b. Access to finance

Access to inputs and investments in on-farm infrastructure require access to finance. While smallholder farmers can access land through different means, limited access to finance to invest in productive infrastructure, equipment and inputs to fully utilise land and expand production remains a key barrier to growth. Smallholder farmers largely rely on government for financial support. Around 50% of interviewees received some form of government support for land and land preparation, installation of irrigation systems and boreholes. While this shows that smallholder farmers can access government funding, a number of challenges remain.

Government support is limited in scale and scope, and it is provided in a piecemeal manner, which constrains the growth of smallholder farmers. There are also key gaps in government support in that it does not cover weather and climate change related risks, which are increasingly impacting on smallholder farmers who still practice open field farming. Furthermore, regarding application processes, most applicants – both that were successful and that were not successful – complained that the application processes and forms are complicated and there is red tape. Often small farmers do not have all the requirements stipulated on the forms including bookkeeping, limiting their chances of being approved for funding. There is also lack of assistance from the department on how applicants can fill out the application forms when they encounter difficulties. When farmers approach officials from the department of agriculture, the officials are also not sure of what is required on the forms.

To address the challenges of limited access to finance, farmers resort to alternative sources of funding. These include personal funds from parallel businesses, full time jobs, savings and borrowing from friends and family.¹⁴ These parallel businesses leave farmers with limited time to focus on production and because smallholder farmers play multiple roles on their farms, they are extremely time constrained.

c. Access to reliable, high return markets

Smallholder vegetable farmers sell their produce in diverse local markets including through informal markets, local supermarkets, FPMs, and corporate clients. While there are challenges in accessing some of these markets especially supermarkets and corporate clients, the main challenge for smallholder farmers across the different routes to market relates to low prices of fresh produce and high price fluctuations.

All the farmers interviewed supply to direct customers in informal markets. This is an important route to market for fresh produce accounting for 42% of national sales. Direct sales offer farmers higher prices compared to all other markets partly because they have relative bargaining power in setting prices of their fresh produce. Direct sales also allow smallholder farmers to capture most of the value from the sale of their fresh produce

¹⁴ Interviews with F01 on 10 August 2022, F04 on 22 August 2022, F07 on 28 September 2022, F09 on 17 October 2022, F10 on 18 October 2022, F16 on 07 November 2022, F18 on 08 November 2022, F22 on 21 November 2022, F24 on 21 November 2022, F25 on 22 November 2022, F31 on 24 November 2022.

because they can save on costs or fees related to agents and middlemen.¹⁵ However, demand in informal markets is unpredictable and erratic, which makes such markets unreliable.¹⁶ There is no guarantee of purchase in informal markets and to compensate for this, farmers charge higher prices.

Given the challenges associated with informal markets, farmers prefer to supply local supermarket chains within their areas of production. 50% of the farmers interviewed supply local supermarket chains. These are largely Spar and Boxer, which are mostly located in and around production areas and in residential and rural areas.¹⁷ Supermarket chains are consistent and reliable¹⁸ in terms of offtake agreements. The farmer is guaranteed of supply and to compensate for this, farmers are prepared to take a lower price.¹⁹ Although farmers in some cases can negotiate the prices at which they supply vegetables with the supermarkets, they raised the challenge that supermarkets procure fresh produce from smallholder farmers at generally low prices. Supermarkets can negotiate down prices with smaller vegetable farmers and this owes to the high levels of concentration in the supermarket industry with the largest five supermarket chains accounting for 64% of grocery retail sales in South Africa (Chisoro-Dube and das Nair, 2020). In addition, the perishable nature of vegetables coupled with lack of investments in cold chain facilities limit the farmers' bargaining power forcing them to make immediate purchases at low prices.

Supermarkets are also able to impose a range of standards and requirements, often unilaterally, leveraging their buyer power. However, they exercise a huge degree of leniency with smallholder vegetable farmers. None of the vegetable farmers interviewed had investments in packhouses, cold rooms or standards certifications leaving quality based on visual inspection for freshness and colour (and in some cases volume) as key requirements for supplying supermarkets.

Alongside informal markets and supermarket chains, vegetable farmers also supply FPMs through market agents. FPMs are an important route to market especially for smallholder vegetable farmers because they are open, and constitute a key route to market accounting for 44% of total fresh produce sales in the country.

While the intention behind the creation of FPMs was to provide equal trade opportunities for large- and small-scale farmers, smallholder farmers still face several challenges with profitability supplying these markets. Farmers are not guaranteed a sale in these markets. Sometimes the agent fails to sell part or all of the farmer's produce and this produce gets

¹⁵ Interviews with F02 on 11 August 2022, F07 on 28 September 2022, F08 on 23 September 2022, F09 on 17 October 2022, F25 on 22 November 2022, F26 on 22 November 2022.

¹⁶ Interviews with F02 on 11 August 2022, F07 on 28 September 2022, F08 on 23 September 2022, F09 on 17 October 2022, F17 on 08 November 2022, F25 on 22 November 2022, F26 on 22 November 2022.

¹⁷ Interviews with F04 on 22 August 2022, F10 on 18 October 2022, F22 on 21 November 2022, F25 on 22 November 2022, F26 on 22 November 2022, F27 on 23 November 2022, F32 on 25 November 2022.

¹⁸ Interviews with F17 on 08 November 2022, F22 on 21 November 2022, F25 on 22 November 2022, F26 on 22 November 2022, F27 on 23 November 2022, F32 on 25 November 2022.

¹⁹ Interviews with F17 on 08 November 2022, F22 on 21 November 2022, F25 on 22 November 2022, F26 on 22 November 2022, F27 on 23 November 2022, F32 on 25 November 2022.



discarded.²⁰ Farmers cited several instances when their produce was thrown away. In addition, prices at FPMs drop to very low levels and this is partly due to oversupply of fresh produce on these markets. For example, farmers highlighted that the prices of spinach can drop by 80 to 85% from as high as R15 - R20 a bunch to as low as R2.50 - R3.00 per bunch.²¹ Such huge drops in prices are not sustainable especially for smallholder farmers given the rising costs of inputs and the direct costs of growing. While large farmers are able to send their produce to FPMs on a daily basis averaging the high and low prices, the same strategy is not viable for smallholder farmers given their smaller volumes, transport costs, agent and market fees.²² A majority of smallholder farming businesses claim they are making losses while others are barely breaking even despite being in the business for over two to three years.²³ Smallholder farmers raised concerns around low prices that have not increased in many years despite steep increases in input costs. This corroborates the falling trends in real average prices in Figure 2 which has implications for farmers' welfare and profitability. These challenges have led to several smallholder farmers using FPMs as a market of last resort, only supplying remaining produce after satisfying all other preferred markets. Other smallholder farmers have stopped supplying FPMs altogether. This has resulted in large commercial farmers dominating supply to FPMs, which has historically been the case (Louw, Jordaan, Ndanga and Kirsten, 2008).

Another factor that contributes to the downward pressure on prices is that vegetable farmers tend to be concentrated within specific areas production, growing the same vegetables in the same seasons, thereby flooding the market and dampening prices. To address these issues, a few farmers within close proximity to one another in a particular growing area have coordinated planting times whereby they produce the same vegetables but at different times in the year.²⁴

Beyond localized markets, a few vegetable farmers are exporting into the region, which is important for diversifying away from local markets. These include farmers in Limpopo (in the northern province of the country) exporting to Zimbabwe and Zambia. Buyers provide transport services and collect the fresh produce directly from the farms.²⁵

d. Access to information

The challenges of limited farming knowledge and experience among smallholder farmer entrants is creating a growing role for informal industry networks as platforms for farmers

²⁰ Interviews with F02 on 11 August 2022, F04 on 22 August 2022, F07 on 28 September 2022, F10 on 18 October 2022, F22 on 21 November 2022, F25 on 22 November 2022, F26 on 22 November 2022, F27 on 23 November 2022, F32 on 25 November 2022.

²¹ Interviews with F02 on 11 August 2022, F07 on 28 September 2022, F10 on 18 October 2022, F13 on 25 August 2022, F16 on 07 November 2022.

²² Interviews with F02 on 11 August 2022, F04 on 22 August 2022, F07 on 28 September 2022, F10 on 18 October 2022, F22 on 21 November 2022, F25 on 22 November 2022, F26 on 22 November 2022, F27 on 23 November 2022, F32 on 25 November 2022.

²³ Interviews with F01 on 10 August 2022, F04 on 22 August 2022, F07 on 28 September 2022, F09 on 17 October 2022, F10 on 18 October 2022, F16 on 07 November 2022, F18 on 08 November 2022, F22 on 21 November 2022, F24 on 21 November 2022, F25 on 22 November 2022, F31 on 24 November 2022.

²⁴ Interviews with F25 on 22 November 2022, F26 on 22 November 2022, F27 on 23 November 2022.

²⁵ Interviews with F01 on 10 August 2022, F30 on 24 November 2022.

to learn, get advice and share knowledge on best practices. This is crucial for the success of smallholder farmers. Farming is a learning by doing activity, which requires sharing of knowledge and information. Black smallholder farmers as first-generation farmers have limited knowledge and networks handed down from generation to generation.

Industry networks in the vegetable industry take the form of individual farmers that connect with neighbouring and geographically dispersed farmers through social media platforms such as WhatsApp. They organise themselves to form communities of farmers that share information on a range of issues including types of crops to grow in different seasons, pests and diseases, chemicals to spray, fertilisers, recommended input suppliers and markets. Often, farmers do not know where to find assistance including references of reputable input suppliers and service providers.²⁶ In addition, through these platforms, farmers invite industry stakeholders (retailers, agronomists, input suppliers) to present on particular issues relevant to their farming businesses.²⁷ These networks are even more important in the context of smallholder farmers who play multiple roles in the entire business. Unlike large farmers, they typically cannot afford the services of technical experts.

Leveraging their supply chains, some smallholder farmers build relationships with the wider ecosystem of industry actors.²⁸ These include input suppliers and industry experts such as agronomists, technical sales representatives, and customers in key markets. These provide information on several aspects including customer trends, diseases and pest control solutions.²⁹

Smallholder farmers are also part of networks which include academics, government, and non-governmental organisations (NGOs) where they conduct training and raise industry challenges with government. However, the vegetables industry unlike other industries in the horticulture sector does not have institutionalized access to the state owing to the lack of collective industry organisation. The industry therefore lacks the platform to collectively solve industry challenges for improved competitiveness of individual farmers and the industry as a whole.

5. Conclusions and recommendations

The study sought to understand entry and participation of smallholder farmers in the vegetables industry through identifying the nature of activities that they are involved in. The paper then explored the nature of barriers to entry and growth faced by these participants and how these shape outcomes and opportunities for inclusion and building of stronger productive capabilities. Through these insights, the study aims to inform and contribute towards key sectoral agricultural and industrial policy initiatives to improve participation of smallholder farmers in the vegetables industry.

²⁶ Interviews with F11 on 30 July 2022, F13 on 25 August 2022, F17 on 08 November 2022, F22 on 21 November 2022.

²⁷ Interviews with F11 on 30 July 2022, F17 on 08 November 2022, F32 on 25 November 2022.

²⁸ Interviews with F11 on 30 July 2022, F13 on 25 August 2022, F17 on 08 November 2022, F22 on 21 November 2022.

²⁹ Interviews with F05 on 15 September 2022, F11 on 30 July 2022, F17 on 08 November 2022, F25 on 22 November 2022, F26 on 22 November 2022, F27 on 23 November 2022.

Despite widespread entry and participation of smallholder farmers into vegetable production, they grow low value vegetables, sell in low return markets and struggle to grow and scale up their operations. Smallholder vegetable farmers enter the industry through growing leafy vegetables (such as spinach and kale), cabbages, carrots and butternuts. Although these are considered easier and less expensive vegetables to grow with a ready market, they have experienced the largest declines in real average prices since 2009. Hence, the type of vegetables grown by smallholder farmers contribute to their lack of profitability, which is exacerbated by the low prices and fluctuations in prices of fresh produce.

Smallholder farmers also lack access to adequate resources to invest in productive infrastructure and inputs necessary to expand production, produce high quality fresh produce and ensure consistent supply. This limits their ability to take advantage of the higher prices in seasons of low supply and average out the high and low prices in the market.

The interrelated and compounded challenges of limited access to finance to invest in on-farm infrastructure and inputs, and the low prices of vegetables create a vicious cycle, which locks smallholder vegetable farmers into low value activities with limited opportunities for growth and scaling up. This has implications for how smallholder vegetable farmers enter and participate in these markets including their potential to contribute to the wider sector through employment and payment of decent wages.

The different challenges and opportunities raised in this study have important implications for the implementation of key policy initiatives such as the Agriculture and Agro-processing Master Plan (AAMP) and the Competition's Commission's National Fresh Produce Market Inquiry. The AAMP aims to increase the share of black ownership and contribution of small-scale vegetable producers from 1% of total output in 2019 to 20% in 2030; and expanding their area planted from 400 hectares to 11,000 hectares. Increasing the contribution of smallholder vegetable farmers requires that support is provided as a holistic package encompassing funding, skills, productive infrastructure, inputs and access to markets. Such efforts entail improving smallholder farmers' access to government funding through streamlining application processes and providing much needed assistance to smallholder farmers in filling out application forms. Such measures increase smallholder farmers' chances of accessing funding.

To be profitable, markets need to work for smallholder vegetable farmers. The Competition Commission's National Fresh Produce Market Inquiry presents an opportunity to understand factors that contribute to low prices and discarding of farmers' fresh produce in these markets, which in turn can be used to improve access to markets. FPMs are an important route to market for smallholder vegetable farmers given the low barriers to entry. Their ability to participate profitably in these markets through addressing pricing related issues is therefore critical for smallholder farmers' sustainability.

Alongside domestic local markets, the AAMP's initiative to explore regional export opportunities leveraging new markets in SADC through the African Continental Free Trade Area Agreement (AfCFTA) is important for broadening and diversifying access to markets for smallholder vegetable farmers. A few vegetables farmers export into the region. As such, government's efforts to support exports will assist exporting smallholder farmers to further grow their footprint in regional markets and also facilitate entry of new smallholder farmers

into export markets. Export markets offer higher prices than local markets, which can improve profitability of smallholder farmers.

While the challenges of smallholder farmers are well-documented in literature and policy documents, there is lack of an explicit and actionable strategy to address the various productivity constraints and market access related issues faced by smallholder farmers. This is despite the evidence that inclusive growth of smallholder farmers has great benefits for reducing rural poverty and unemployment.

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